



BSI Standards Publication

# **Rough-terrain trucks — Safety requirements and verification**

Part 6: Application of EN ISO 13849-1 to slewing and non-slewing variable-reach rough-terrain truck

### **National foreword**

This Published Document is the UK implementation of CEN/TR 1459-6:2015.

The UK participation in its preparation was entrusted to Technical Committee MHE/7, Industrial trucks.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2015. Published by BSI Standards Limited 2015

ISBN 978 0 580 83396 0

ICS 53.060

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 September 2015.

### **Amendments issued since publication**

Date	Text affected
------	---------------

---

ICS 53.060

English Version

**Rough-terrain trucks - Safety requirements and verification –  
Part 6: Application of EN ISO 13849-1 to slewing and non-  
slewing variable-reach rough-terrain truck**

This Technical Report was approved by CEN on 6 July 2015. It has been drawn up by the Technical Committee CEN/TC 150.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

European foreword.....	5
Introduction .....	6
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 General.....	8
5 Description of the procedure followed to determine PL <sub>r</sub> for SRP/CS of trucks.....	11
6 Risk assessment methodology .....	11
7 Risk Assessment Process .....	12
7.1 Determination of Machine limits .....	12
7.2 Hazard identification (5.4 annex B of EN ISO 12100) .....	14
7.3 Risk evaluation.....	15
8 Required performance level for SRP/CS of trucks.....	16
8.1 prEN 1459-1 .....	16
8.2 prEN 1459-2 .....	17
8.3 prEN 1459-3 .....	18
Annex A (informative) Hazard identification.....	19
A.1 prEN 1459-1 .....	19
A.2 EN 1459-2.....	26
A.3 EN 1459-3.....	30
Annex B (informative) Numerical weighting of Risk Priority Number (RPN) .....	32
Annex C (informative) Risk priority number and corresponding performance level .....	33
Annex D (informative) Comparison of risks prEN 1459-1 and EN 1459-2.....	34
Annex E (informative) Risk Estimation and Evaluation .....	38
E.1 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Operator.....	38
E.2 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Co-worker .....	42
E.3 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Bystander .....	45
E.4 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Operator.....	48
E.5 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Co-worker .....	51
E.6 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Bystander .....	54
E.7 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Operator.....	57
E.8 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Co-worker .....	60
E.9 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Bystander .....	63
E.10 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.9 Operator.....	66
E.11 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.9 Co-worker .....	69
E.12 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.13 Bystander .....	72
E.13 Hazard Identification Risk Estimation and Evaluation from 3.10. to 3.13 Operator.....	76
E.14 Hazard Identification Risk Estimation and Evaluation from 3.10. to 3.13 Co-worker .....	79
E.15 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Operator.....	82
E.16 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Co-worker .....	85
E.17 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Bystander .....	88
E.18 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 Operator.....	90
E.19 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 Co-worker .....	93
E.20 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 bystander.....	96
E.21 Hazard Identification Risk Estimation and Evaluation from 4.10. to 4.15 Operator.....	99
E.22 Hazard Identification Risk Estimation and Evaluation from 4.12. to 4.16 Co-worker .....	102
E.23 Hazard Identification Risk Estimation and Evaluation from 4.12. Bystander.....	105
E.24 Hazard Identification Risk Estimation and Evaluation from 6.1. to 6.5 Operator.....	107

E.25	Hazard Identification Risk Estimation and Evaluation from 6.1. to 6.5 Co-worker.....	110
E.26	Hazard Identification Risk Estimation and Evaluation from 6.4. to 6.9 Bystander .....	113
E.27	Hazard Identification Risk Estimation and Evaluation from 6.6. to 6.10 Operator .....	116
E.28	Hazard Identification Risk Estimation and Evaluation from 6.6. to 6.10 Co-worker.....	119
E.29	Hazard Identification Risk Estimation and Evaluation from 6.10. to 6.15 Bystander .....	122
E.30	Hazard Identification Risk Estimation and Evaluation from 6.11. to 6.14 Operator .....	125
E.31	Hazard Identification Risk Estimation and Evaluation from 6.11. to 6.14 Co-worker.....	128
E.32	Hazard Identification Risk Estimation and Evaluation from 6.15. to 6.18 Operator .....	131
E.33	Hazard Identification Risk Estimation and Evaluation from 6.15. to 6.18 Co-worker.....	134
E.34	Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.10 Operator .....	137
E.35	Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.5 Co-worker.....	140
E.36	Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.8 Bystander .....	143
E.37	Hazard Identification Risk Estimation and Evaluation from 7.6. to 7.10 Co-worker.....	146
E.38	Hazard Identification Risk Estimation and Evaluation from 8.1. to 8.7 Operator .....	149
E.39	Hazard Identification Risk Estimation and Evaluation from 8.1. to 8.4 Co-worker.....	152
E.40	Hazard Identification Risk Estimation and Evaluation from 8.2. to 8.5 Bystander .....	155
E.41	Hazard Identification Risk Estimation and Evaluation from 8.8 to 8.12 Operator .....	158
E.42	Hazard Identification Risk Estimation and Evaluation from 8.5. to 8.8 Co-worker.....	161
E.43	Hazard Identification Risk Estimation and Evaluation from 8.9. to 8.12 Co-worker.....	164
E.44	Hazard Identification Risk Estimation and Evaluation from 9.1. to 9.6 Co-worker.....	167
E.45	Hazard Identification Risk Estimation and Evaluation from 9.1. to 9.4 Bystander .....	170
E.46	Hazard Identification Risk Estimation and Evaluation 10.2 Operator .....	173
E.47	Hazard Identification Risk Estimation and Evaluation from 10.1 to 10.2 Co-worker.....	174
E.48	Hazard Identification Risk Estimation and Evaluation 10.2 Bystander .....	177
E.49	Hazard Identification Risk Estimation and Evaluation from 18.1 to 18.4 Operator .....	180
E.50	Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.17 Co-worker.....	183
E.51	Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.21 Bystander .....	186
E.52	Hazard Identification Risk Estimation and Evaluation from 18.4 to 18.8 Operator .....	189
E.53	Hazard Identification Risk Estimation and Evaluation from 18.18 to 18.22 Co-worker.....	192
E.54	Hazard Identification Risk Estimation and Evaluation from 18.9 to 18.12 Operator .....	195
E.55	Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.16 Operator .....	198
E.56	Hazard Identification Risk Estimation and Evaluation from 19.1 to 19.4 Operator .....	201
E.57	Hazard Identification Risk Estimation and Evaluation from 19.9 to 19.13 Co-worker.....	204
E.58	Hazard Identification Risk Estimation and Evaluation from 19.10 to 19.13 Bystander .....	207
E.59	Hazard Identification Risk Estimation and Evaluation from 19.5 to 19.16 Operator .....	210
E.60	Hazard Identification Risk Estimation and Evaluation from 19.17 to 19.20 Operator .....	213
E.61	Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Operator .....	216
E.62	Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Co-worker.....	219
E.63	Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Bystander.....	222
E.64	Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Operator .....	225
E.65	Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Co-worker.....	228
E.66	Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Bystander .....	231
E.67	Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Operator .....	234
E.68	Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Co-worker.....	237
E.69	Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Bystander .....	240
E.70	Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.5 Operator .....	243
E.71	Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.4 Co-worker.....	246
E.72	Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.3 Bystander .....	249
E.73	Hazard Identification Risk Estimation and Evaluation from 21.6 to 21.9 Operator .....	252
E.74	Hazard Identification Risk Estimation and Evaluation from 21.5 to 21.9 Co-worker.....	255
E.75	Hazard Identification Risk Estimation and Evaluation from 21.4 to 21.6 Bystander .....	258
E.76	Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.5 Operator .....	261
E.77	Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.5 Co-worker.....	264
E.78	Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.4 Bystander .....	267
E.79	Hazard Identification Risk Estimation and Evaluation from 22a.6 to 22a.10 Operator .....	270
E.80	Hazard Identification Risk Estimation and Evaluation from 22a.6 to 22a.10 Co-worker.....	273
E.81	Hazard Identification Risk Estimation and Evaluation from 22a.7 to 22a.10 Bystander .....	276
E.82	Hazard Identification Risk Estimation and Evaluation from 22b.1 to 22b.4 Operator .....	279
E.83	Hazard Identification Risk Estimation and Evaluation from 22b.1 to 22b.4 Co-worker .....	282
E.84	Hazard Identification Risk Estimation and Evaluation from 22b.7 to 22b.9 Bystander .....	285
E.85	Hazard Identification Risk Estimation and Evaluation from 22b.5 to 22b.8 Operator .....	288

E.86	Hazard Identification Risk Estimation and Evaluation from 22b.5 to 22b.8 Co-worker.....	291
E.87	Hazard Identification Risk Estimation and Evaluation from 22b.10 to 22b.12 Bystander.....	294
E.88	Hazard Identification Risk Estimation and Evaluation from 22b.9 to 22b.12 Operator .....	297
E.89	Hazard Identification Risk Estimation and Evaluation from 22b.9 to 22b.13 Co-worker.....	300
E.90	Hazard Identification Risk Estimation and Evaluation from 22b.13 to 22b.15 Operator .....	303
E.91	Hazard Identification Risk Estimation and Evaluation from 22b.14 to 22b.18 Co-worker .....	306
E.92	Hazard Identification Risk Estimation and Evaluation from 22b.16 to 22b.18 Operator .....	309
E.93	Hazard Identification Risk Estimation and Evaluation from 22c.1 to 22c.3 Operator.....	312
E.94	Hazard Identification Risk Estimation and Evaluation from 22c.1 to 22c.3 Co-worker.....	315
E.95	Hazard Identification Risk Estimation and Evaluation from 22c.3 to 22c.4 Bystander .....	318
E.96	Hazard Identification Risk Estimation and Evaluation from 22c.4 to 22c.6 Operator.....	321
E.97	Hazard Identification Risk Estimation and Evaluation from 22c.4 to 22c.6 Co-worker.....	324
E.98	Hazard Identification Risk Estimation and Evaluation from 22d.1 to 22d.6 Operator .....	327
E.99	Hazard Identification Risk Estimation and Evaluation from 22d.1 to 22d.6 Co-worker.....	330
E.100	Hazard Identification Risk Estimation and Evaluation from 22d.3 to 22d.4 Bystander.....	333
	<b>Bibliography .....</b>	<b>342</b>

## European foreword

This document (CEN/TR 1459-6:2015) has been prepared by Technical Committee CEN/TC 150 “Industrial Trucks - Safety”, the secretariat of which is held by BSI.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

EN 1459 consists of the following parts, under the general title *Rough-terrain trucks — Safety requirements and verification*:

- *Part 1: Variable-reach trucks*
- *Part 2: Slewing variable-reach trucks*
- *Part 3: Interface between the variable-reach truck and the work platform*
- *Part 4: Additional requirements for variable reach trucks handling freely suspended loads*
- *Part 5: Additional requirements for attachments and attachment interface*
- *Part 6: Application of EN ISO 13849-1 to slewing and non-slewing variable-reach rough-terrain trucks*

## **Introduction**

This Technical Report has been prepared to explain the rationale used to determine the minimum required Performance Levels for rough terrain variable reach trucks as listed in EN 1459 series.

It is intended to provide solid basis to the Performance Level Required (PL<sub>r</sub>) required for the Safety Related Part of Control System (SRP/CS) referred to in prEN 1459-1, EN 1459-2 and EN 1459-3. The PL<sub>r</sub> have been defined by using approaches from appropriate standards for safety of machinery and proven general principles for design.

The methodology described in this Technical Report may be used by other Technical Committees to assess the risk and determine PL<sub>r</sub> for machines covered by other type C-standards.



## 1 Scope

This Technical Report describes the risk assessment methodology followed to determine the Performance Level required (PL<sub>r</sub>), as defined in EN ISO 13849-1:2008, for specific safety related parts of control system (SRP/CS) of rough-terrain variable-reach trucks covered by prEN 1459-1, EN 1459-2 and EN 1459-3.

This Technical Report does not apply to SRP/CS that includes no electrical/electronic components.

NOTE It is the intention of CEN TC150 WG2 to use the same methodology to develop future standards (e.g. further parts of EN 1459).

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 1459-1:2015, *Rough-terrain trucks — Safety requirements and verification — Part 1: Variable-reach trucks*

EN 1459-2:2015 *Rough-terrain trucks — Safety requirements and verification — Part 2: Slewing variable-reach trucks*

EN 1459-3:2015 *Rough-terrain trucks — Safety requirements and verification — Part 3: Interface between the variable-reach truck and the work platform*

EN ISO 12100:2010 *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2008 *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

ISO/TR 14121-2:2012 *Safety of machinery — Risk assessment — Part 2: Practical guidance and examples of methods*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100, prEN 1459-1:2015, EN 1459-2:2015 and EN 1459-3:2015 and the following apply.

### 3.1

#### **operator**

competent person who controls the operation of the truck

### 3.2

#### **co-worker**

trained person who is working in the vicinity of the truck but not in control of the truck

### 3.3

#### **by-stander**

untrained person who is in the vicinity of the truck and not involved in the job site activity

## **4 General**

It is intended that this document be read in conjunction with the corresponding Parts -1, -2 and -3 of this standard (EN 1459).

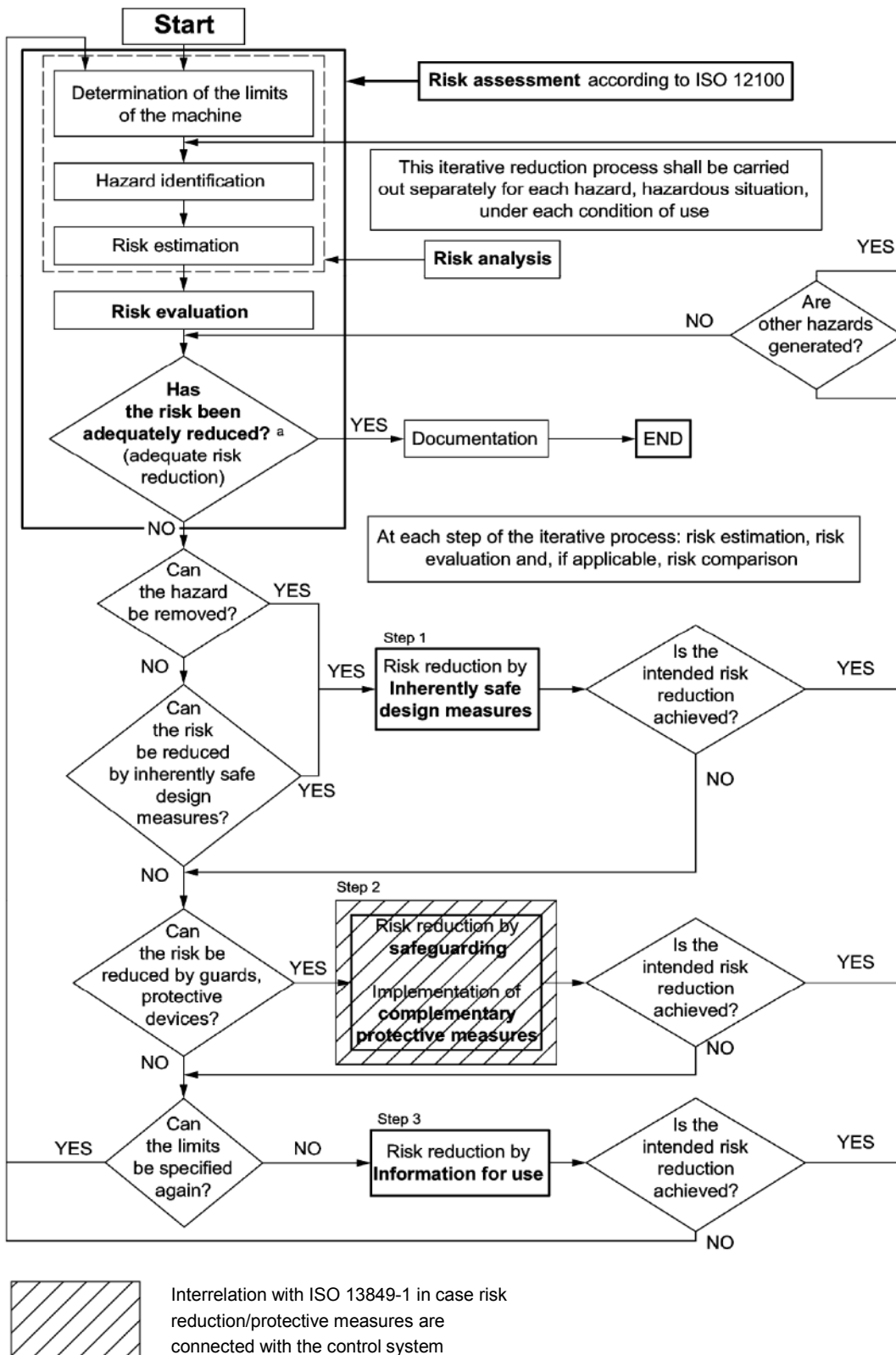
EN ISO 13849-1 applies to the safety related parts of control system including the design of software, regardless of the type of technology and energy used (electrical, electronic, hydraulic, pneumatic, mechanical, etc.), for all kinds of machinery.

For safety functions that comprise mechanical parts only, no specific performance level is necessary.

There are many control systems fitted to trucks but not all will be subject to the requirements of EN ISO 13849-1.

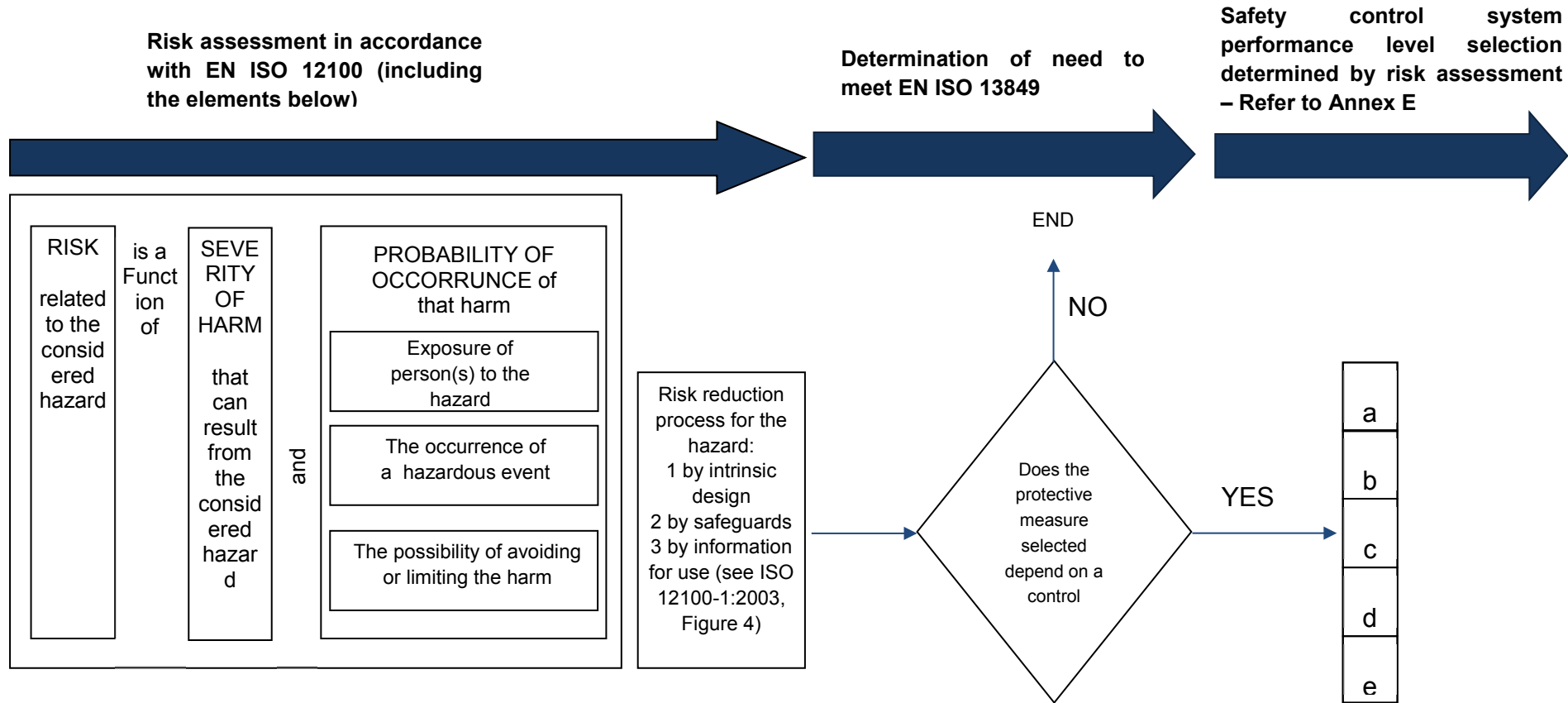
EN ISO 13849-1 is relevant for cases where a risk assessment according to EN ISO 12100 has initiated a risk reduction measure that relies on a safety-related control system. In those cases the safety-related control system has to perform a safety function. The application of EN ISO 13849-1 is restricted to those cases only (see figures 1 and 2).

Systems may be subject to specific requirements in other standards e.g ISO 6292 - *Powered industrial trucks and tractors — Brake performance and component strength*.



<sup>a</sup> The first time the question is asked, it is answered by the result of the initial risk assessment.

**Figure 1 — Process flow chart**



**Figure 2 — Abbreviated EN ISO 12100/EN ISO 13849-1 process drawing distinction between risk assessment and control system performance selection**

## 5 Description of the procedure followed to determine PL<sub>r</sub> for SRP/CS of trucks

The first stage of meeting EN ISO 13849-1 is to take the risk assessment/risk reduction output from following EN ISO 12100 and to check whether the protective measure selected depends on the control system.

In order to perform the EN ISO 12100 assessment correctly for trucks with respect to EN ISO 13849-1 compliance, any existing control system which has been added / modified for achieving safety should be disregarded at a first stage so that the risk they are addressing can be understood. This is important to get the correct inputs if the system is later determined as SRP/CS and requires a PL<sub>r</sub> to be determined.

The following key stages were applied to determine PL<sub>r</sub> for SRP/CS:

- a) Identify which functions of the truck involve SRP/CS and identify the relevant clauses in the standard. Determine control systems (mechanical, hydraulic, pneumatic, electrical/electronic, electro-mechanical, electro-hydraulic...) that are necessary for the truck to carry out its intended function 8.2 and Annex A)
- b) Determine the intended truck limits as per EN ISO 12100:2010 clause 5.3 (see 8.1)
- c) Perform risk assessment in accordance with EN ISO 12100:2010 clauses 5.5 and 5.6 (see Annex E)
- d) Take into account any risk reduction measures (intrinsic design and safeguards) and re-assess the system to determine if the intended risk reduction has been achieved at this point any existing control systems that are known to be used/added/modified for achieving safety should be considered as a risk reduction measure. (see 8.3, Annex E and EN ISO 12100:2010 clause 5.6)
- e) Determine if the protective measure selected is dependent upon a control system (and is therefore SRP/CS). If it is not the process ends here.
- f) If the protective measure is dependent upon a control system, use the information from the EN ISO 12100 Risk Assessment to determine the EN ISO 13849-1 performance level that applies to that system (this should consider that other non-control system risk reduction measures intended to be fitted are in-place) (see Annex E)

NOTE The integrity of control systems which are not subject to EN ISO 13849-1 are to be ensured by following sound engineering practice and by following relevant technical requirements and standards as applicable. EN ISO 13849-1 imposes an extra burden to SRP/CS due to the nature and importance of these in providing safety to exposed persons.

## 6 Risk assessment methodology

EN ISO 12100 does not define a risk assessment method but does define the elements to be considered. Users of the above standard are free to choose a risk assessment method and ISO/TR 14121-2 provides practical guidance and examples. It should be noted that the informative "Risk Graph" as presented in EN ISO 13849-1 is not a risk assessment tool that fulfils the needs of EN ISO 12100 as it does not include the important component of "probability of occurrence". It also offers limited selection of exposure, possibility of avoidance or limiting harm and severity as compared to other documented risk graphs (see for example ISO/TR 14121-2, A.4).

The risk graph in EN ISO 13849-1 is a tool to determine a PL<sub>r</sub> but is not a risk assessment method, this tool was used to determine risks associated with a press and therefore its value is limited in relation to mobile machinery. See 8.3 for risk evaluation of trucks.

Document ISO/DTR 18670 *Safety of machinery — How EN ISO 12100 relates to EN ISO 13849-1* gives more explanation on this point, for instance in clause 4.1 it's written that:

*“For the correct application of EN ISO 13849-1 basic input information resulting from the application of the overall risk assessment and risk reduction process for the particular machine design is necessary. Based on this input information the safety-related parts of the control system can be appropriately designed according to EN ISO 13849-1. Information resulting from a detailed design of safety-related parts of the control system relevant for its integration into the machine design has then to be considered in the overall risk assessment and risk reduction process according to EN ISO 12100.”*

*“...Consequently all necessary input information for the selection of the  $PL_r$  (elements of risk values for the considered hazardous situation) are available from the overall risk assessment and risk reduction process according to EN ISO 12100.*

*Therefore a separate risk assessment for the application of EN ISO 13849-1 is not necessary. The graph given in EN ISO 13849-1:2006, Figure A.1 is used only to select the  $PL_r$  for safety functions and is not intended to be used as a risk estimation method for the overall machine according to EN ISO 12100.”*

The risk evaluation used for trucks is based on the Kinney method machinery safety<sup>1)</sup>.

## 7 Risk Assessment Process

### 7.1 Determination of Machine limits

The following limits of use for the trucks is determined first in accordance with ISO 14121 to assist with the risk assessment.

a) Intended use:

- Starting
- Driving
- Load handling
- User stabilizers
- Operation (right side window breakage)
- Maintenance
- Lifting of persons (only EN 1459-3)
- 

b) Foreseeable misuse:

- Overriding of LLMC-LLMI and other safety devices (not emergency situation)
- Use of stabilizers to displace the machine
- Improper use of forks and other attachments

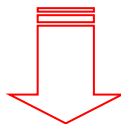
---

1) Fine, W.T. 1971. Mathematical Evaluation for controlling Hazards, Journal of Safety Research.  
Kinney, G & Wiruth A. 1976, Practical Risk Analysis for Safety management

- Overload of the platform (only EN 1459-3)
- Overriding of controls in normal operation condition (only EN 1459-3)
- Use not integrated platform (only EN 1459-3)

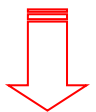
c) Limit to the use of the machine by persons:

- 95% men
- Mostly between 18-60 years, occasionally between 14-18 years and more than 60
- Right hand operator (dominant hand usage)
- Visual limits for placing loads (17-18 m), more for driving (visibility measured at 12 m considered as the reaction time as per EN 15830)
- Hearing limits (regularly checked and medically approved to operate the machine)
- Physical size: 5-95 percentile of human size distribution
- Strength: level for steering and braking in case of failure
- level of training and experience of the operator: newcomers (not trained) and experienced (rely too much on the experience, less prepared to adapt to new machine and devices).
- Increased legal obligation for a training for the operator
- experience or ability of the users



- operators (refer to above)
- maintenance persons
- trainees
- general public (they should not be entitled to operate machines if they are not properly trained)

— exposure of other persons



- other operators
- co-workers in the vicinity
- non-employees and visitors in the vicinity including children (work site supervisor's responsibility)

d) Space limits

- Range of movements (travelling, boom movement, stabilizers movement, cab and guards movement)
- Range of movements (boom movement, platform movement) (only EN 1459-3)
- Space required to interact with the machine
  - For the operator

- For maintenance people
  - Operator-machine interface
  - Machine power supply interface
- e) Time limits
- Life time of machine and/or components
  - Recommended service intervals
  - Stress due to job schedule (quickest way to carry out a task)
- f) Other limits:
- Exposure to animals and human reaction
  - Environmental
    - Minimum and maximum temperature
    - Indoor and outdoor usage
    - Weather (dry/wet/rain/snow/fog/direct sunlight/dust)
    - Ground conditions
      - Level of cleanness required of the machine and cleaning process
      - Characteristic of the material to be handled (not applicable to EN 1459-3)
      - human error/behaviour
      - human behaviour when faced with a failure or incident with the machine

## 7.2 Hazard identification (5.4 annex B of EN ISO 12100)

Annex A includes tables which were created to identify the clauses which include SRP/CS within prEN 1459-1, EN 1459-2 and EN 1459-3 and therefore a PL<sub>r</sub>.

The hazard identification numbering corresponds to the references within the risk assessment spread sheet.

Where information is strikethrough an explanation is given rather than deleting the information to demonstrate the thought processes.

In Annex E, each line of the risk assessment is a breakdown of the task and hazardous events that may occur.

NOTE 1 Indicators are not part of control system (SRP/CS) so are not addressed in this analysis.

NOTE 2 Tasks including setting, corrective maintenance (being realized at the factory or at the dealership generally) are considered not applicable to the by-standers assessment because these are carried out by trained personnel.



### 7.3 Risk evaluation

The complete risk evaluation and calculation is in Annex E.

The risk evaluation is based on the statistical / numerical method of calculating machinery safety first developed by Kinney, G and Wiruth A. 1976, Practical Risk Analysis for Safety management.

The risk is calculated separately for the three pre-determined groups operator, co-worker and bystander

The risk evaluation is made in two steps:

- a) the first step (columns J-O initial assessment) assumes the truck has no safety device fitted or a solution in place for risk reduction on the machine.

The risk priority number (RPN) is calculated using the following formula and the values in Annex B.

$$P \times E \times S \times N = RPN$$

where:

P is the possibility/probability of avoiding the hazard or limiting the harm

E is the exposure (time and frequency) to the hazard

S is the severity of injury

N is the number of persons involved

To determine a performance level the highest RPN is used calculated from the three groups.

The values in Annex C determine the risk rating and where the risk assessment deems this is a safety related part of the control system a corresponding performance level is given.

- a) the second step considers the countermeasures within prEN 1459-1, EN 1459-2 or EN 1459-3 have been implemented fully and are working correctly (columns Q-V).

NOTE For the purpose of the residual risk assessment we have to consider the SRP/CS fitted as a countermeasure is working and  $P=0.033$  is considered the most appropriate value to enable closure of the risk assessment.

## 8 Required performance level for SRP/CS of trucks

Tables 1, 2 and 3 identify performance levels required for the SRP/CS referenced to in prEN 1459-1, EN 1459-2 and EN 1459-3. These PL<sub>r</sub> are based upon generic risk assessment for the collective trucks types with certain control system architecture and being used in the specified application. As such the identified PL<sub>r</sub> are presented for guidance and manufacturers shall verify that the respective PL<sub>r</sub> are in accordance with their own EN ISO 12100 risk assessments.

For electrical, electronic and software based circuits, corresponding Safety Integrity Levels (SILs) according to EN 62061 may be used in accordance with Table 1 of PD ISO/TR 23849:2010 which is replicated below.

**ISO/TR 23849:2010 – Table 1:**

Performance Level	Average Probability of a Dangerous Failure per Hour (1/h)	Safety integrity level (SIL)
a	$\geq 10^{-5}$ to $< 10^{-4}$	No special safety requirements
b	$\geq 3 \times 10^{-6}$ to $< 10^{-5}$	1
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$	1
d	$\geq 10^{-7}$ to $< 10^{-6}$	2
e	$\geq 10^{-8}$ to $< 10^{-7}$	3

Where SILs and PLs are used in the same safety function, combination shall be in accordance with 7.1 and 7.3 of PD ISO/TR 23849: 2010.

### 8.1 prEN 1459-1

**Table 1 — PL<sub>r</sub> for variable-reach trucks**

Ref No.	SRP/CS (clause of prEN 1459-1:2015)	Performance level
1	4.2.2 unintended movement	PLb
2	4.2.3 uncontrolled motion	PLb
3a	4.2.4.a) powered travel movement	PLc
3b	4.2.4.b) powered travel movement	PLb
3c	4.2.4.c) powered travel movement	PLc
4a	4.2.5 non activation of the parking brake	PLb
4b	4.5.5 Multi-function controls – 2nd para	PLb
4c	4.7 stabilizing devices 2nd indent	PLb
4d	4.7 stabilizing devices 4th paragraph	PLb
6	4.5.1.1 multiple operating positions	PLc
7	4.5.1.3 inadvertent activation	PLb
8	4.5.4.2.1 control with detents	PLb
9	4.5.4.2.2 boom float control	PLc
10	4.7 stabilizing devices 1st indent	PLb

NOTE This reference number in the first column of the table refers to Table A1.

## 8.2 prEN 1459-2

The comparison of clauses and risks against PL's already determined for prEN 1459-1 is in Annex D

**Table 2 — PL<sub>r</sub> for slewing variable-reach trucks**

Ref No.	SRP/CS (clause of EN 1459-2:2015)	Performance level
1	4.2.2 unintended movement	PLb
2	4.2.3 uncontrolled motion	PLb
3a	4.2.4.a) powered travel movement	PLc
3b	4.2.4.b) powered travel movement	PLb
3c	4.2.4.c) powered travel movement	PLc
4a	4.2.5 non activation of the parking brake	PLb
6	4.5.1.1 multiple operating positions	PLc
7	4.5.1.3 inadvertent activation	PLb
8	4.5.4.2.1 control with detents	PLb
9	4.5.4.2.2 boom float control	PLc
10	4.7 stabilizing devices 1st indent	PLb
11	4.7 stabilizing devices 3rd indent	PLc
20	4.5.1 f) means shall be provided to prevent any possibility of powered movements actuated by controls if the operator is not at one operator's position.	PLc
21	4.5.8. Axle oscillation locking	PLb
22a	4.10.7.1.1 LLD General	PLc
22b	4.10.7.1.1 LLD General (5th paragraph)	PLc
22c	4.10.7.1.1 LLD General (6th paragraph)	PLc
22d	4.10.7.1.1 LLD General (7th paragraph)	PLc

NOTE This reference number in the first column of the table refers to Table A2.

### 8.3 prEN 1459-3

**Table 3 — PL<sub>r</sub> for trucks fitted with integrated personnel work platform**

<b>Ref No.</b>	<b>SRP/CS</b> (clause of EN 1459-3:2015)	<b>Performance level</b>
18	4.2.2 Engagement of platform	PLc
19	4.2.3 Disengagement of platform	PLc

NOTE this reference number in the first column of the table refers to Table A3.

## Annex A (informative)

### Hazard identification

#### A.1 prEN 1459-1

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
4	5.2.1 unauthorized starting Note: 4.2.1 is covered by 4.2.2 and this is the reason why it isn't addressed here	The machine starts inadvertently	Mechanism and function	Start up setting Restart after unscheduled stop Fault finding/troubleshooting Corrective maintenance
1	4.2.2 unintended movement	The machine moves inadvertently after starting	Mechanism function/parts and Environment	Start up setting Restart after unscheduled stop Fault finding/troubleshooting Corrective maintenance Recovery of operation from jam

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
2	4.2.3 uncontrolled motion Note: the analysis is the same of 4.2.2	The machine moves inadvertently from rest	Mechanism and function Environment Parts	Start up setting Restart after unscheduled stop all modes of operation (boom movement + rpm increase) Fault finding/troubleshooting Corrective maintenance Recovery of operation from jam
3a	4.2.4 a) powered travel movement	The machine moves when the operator is not at the primary operating position	Mechanism and function Environment Parts	Start up <i>Note: the machine has already started up, not applicable.</i> Setting Testing <del>Recovery of operation from jam</del> <i>Note: we considered not applicable</i> <del>Fault finding/troubleshooting</del> <i>Note: we considered not applicable</i> all modes of operation (attachment functions and locking, trailers connection, PTO operations) <del>preventive maintenance</del> <i>Note: we considered not applicable</i> Corrective maintenance <del>Stopping of the machine</del> <i>Note: we considered not applicable</i> <del>Stopping the machine in case of emergency</del> <i>Note: we considered not applicable</i>

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
3b	4.2.4 b) powered travel movement	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control.	Mechanism and function Environment Parts	Start up <i>Note: the machine has already started up, covered by 5.2.2 unintended movement.</i> Setting Testing <del>Restart after unscheduled stop</del> <i>Note: the machine has already started up, covered by 5.2.2 unintended movement</i> all modes of operation (forward travelling, reverse travelling) Corrective maintenance
3c	4.2.4 c) powered travel movement	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	Mechanism and function Environment Parts	Start up Setting Testing Stopping of the machine <del>Stopping the machine in case of emergency</del> <i>Note: we considered this already covered by "stopping of the machine"</i>
4a	4.2.5 non activation of the parking brake	Operator is not warned that the parking brake is engaged.	Mechanism and function Parts	Setting Testing (applicable to operator and co-worker only) Stopping of the machine
4b	4.5.5 Multi-function controls – 2 <sup>nd</sup> para	Operator is not warned about mode of operation (dangerous movements)	Mechanism and function Parts	Setting Testing (applicable to operator and co-worker only) Fault finding/troubleshooting (applicable to operator and co-worker only) All modes of operation
4c	4.7 stabilizing devices 2 <sup>nd</sup> indent	Bystanders hit by stabilizers during travel mode	Mechanism and function Parts	Setting Testing (applicable to operator and co-worker only) All modes of operation

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
4d	4.7 stabilizing devices 4 <sup>th</sup> paragraph	Loss of stability	Mechanism and function Parts	Setting Testing (applicable to operator and co-worker only) All modes of operation
	<del>5.10.7.1 and 5.10.7.2 control panels and control displays</del>	LLMI is not considered here because it is covered by EN 15000. <i>Note: 5.10.7.1 and 5.10.7.2 are too broad to be covered by the analysis and these clauses already give prescriptions because they have got standards references.</i>		
5	5.3.1 – 5.3.2 Brakes	Note: Will be taken into account electrohydraulic brakes, if added to prEN 1459-1	Mechanism and function Environment Parts	Setting Testing Stopping of the machine Stopping the machine in case of emergency Restart after unscheduled stop recovery of operation from jam or blockage (towing) preventive maintenance Corrective maintenance



No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
6a	4.5.1.1 multiple operating positions (the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions)	Uncontrolled load movement Uncontrolled movement of stabilizers, levelling, etc. <i>Note: application of man platform is not considered here but in EN 1459-3 and in EN 280.</i>	Mechanism and function Parts Environment	Setting Testing (daily checks) all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, leveling, steering, forward and reverse travelling) start-up; Stopping of the machine Stopping the machine in case of emergency Restart after unscheduled stop Fault-finding/trouble-shooting (only operator and coworker) <del>Adverse weather conditions (e.g. lightning, wind, etc.)</del> <i>Note: this is something that is not possible to control and we cannot define a performance level for this.</i>
7	4.5.1.3 inadvertent activation (only when the deactivation device is provided)	Uncontrolled load movement (the deactivation device doesn't work properly)	Mechanism and function Parts	<del>Testing</del> —(included in “all modes of operation” because it's determined to be a more controlled environment) all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling) start-up; <del>Stopping of the machine</del> <del>Stopping the machine in case of emergency</del> restart after unscheduled stop Corrective maintenance

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
8	4.5.4.2.1 control with detents (The control mode shall: — be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or — prevent the truck from being restarted until the detent mode is deactivated )	Unintended activation of auxiliary function	Mechanism and function Parts Environment	<del>Setting</del> <del>Testing</del> process/tool changeover start up <del>all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions)</del> removal of product from machine / recovery of operation from jam or blockage <del>Stopping of the machine</del> <del>Stopping the machine in case of emergency</del> <del>restart after unscheduled stop (covered by start up)</del> <del>fault finding/trouble shooting (covered by corrective maintenance)</del> corrective maintenance

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
9	<p>4.5.4.2.2 boom float control</p> <p>For trucks equipped with boom float control, protection shall be provided against unintended lowering of the boom.</p> <p>In addition to 4.5.4.2.1, the boom float control mode shall be automatically deactivated when the boom raising/lowering control is operated.</p>	<p>Unintended lowering of the boom – determined that there is no risk to the operator during this action and only co-worker / bystander were assessed.</p> <p>NOTE: additional safety device to avoid unintended operation of the boom float activation control (2-action control...)?</p>	<p>Mechanism and function</p> <p>Parts</p> <p>Environment</p>	<p><del>Setting</del></p> <p><del>Testing</del></p> <p>Start-up / restart after unscheduled stop</p> <p>all modes of operation (boom raising and lowering)</p> <p><del>Stopping of the machine</del></p> <p><del>Stopping the machine in case of emergency</del></p> <p><del>recovery of operation from jam or blockage</del></p> <p><del>restart after unscheduled stop</del></p> <p><del>fault finding/trouble shooting</del> (covered by corrective maintenance)</p> <p>corrective maintenance / fault finding / trouble shooting</p>
10	<p>4.7 stabilizing devices 1<sup>st</sup> indent:</p> <p>“When stabilising devices are provided</p> <p>- Stabilising devices shall be fitted with means, which keep them in position in case of hose failure or oil leakage.</p>	<p>Unintended movement of stabilizers</p>	<p>Mechanism and function</p> <p>Parts</p> <p>Environment</p> <p><del>Process and material handling</del></p>	<p><del>Testing</del></p> <p>all modes of operation (stabilizers)</p> <p>corrective maintenance - fault-finding/trouble-shooting</p> <p><del>preventive maintenance</del></p> <p>cleaning and housekeeping</p>

**A.2 EN 1459-2**

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
20	4.5.1 f) <i>f) means shall be provided to prevent any possibility of powered movements actuated by controls if the operator is not at one operator's position.</i>	The machine or its elements move inadvertently when the operator is not at the primary operating position.	Mechanism and function Parts Environment	Setting/Testing Operation: slewing Process/tool changeover Corrective maintenance / fault finding / trouble shooting
21	4.5.8 Axle oscillation locking <i>When operating on wheels, means shall be provided to automatically lock the oscillating axle when the slewing upper structure is not in forward aligned position and when the boom is lifted at height greater than the one corresponding to the travel position as defined by the manufacturer</i>	Non-engagement or disengagement of suspension locking system (with loss of stability)	Mechanism and function Parts Environment	Setting/Testing All modes of operation  Corrective maintenance / fault finding / trouble shooting
22a	4.10.7.1.1 LLD General (1 <sup>st</sup> paragraph) <i>Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the load carrying attachment fitted</i>	Tip over, falling objects	Mechanism and function Parts Environment	All modes of operation Corrective maintenance / fault finding / trouble shooting Start-up / restart after unscheduled stop

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
22b	4.10.7.1.1 LLD General (5 <sup>th</sup> paragraph) <i>The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer</i>	Tip over, falling objects	Mechanism and function Parts Environment	Setting/Testing All modes of operation Corrective maintenance / fault finding / troubleshooting

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
22c	4.10.7.1.1 LLD General (6 <sup>th</sup> paragraph) <i>Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage</i>	Tip over, falling objects	Mechanism and function Parts Environment	Setting/Testing (Adjustment and setting or verification of functional parameters of the machine) All modes of operation Corrective maintenance / fault finding / troubleshooting
22d	4.10.7.1.1 LLD General (7 <sup>th</sup> paragraph) <i>When the truck is intended to be used with a range of attachments, the LLD shall be reset accordingly. An attachment selector may allow the operator to set the LLD with reference to the attachment used</i>	Tip over, falling objects	Mechanism and function Parts Environment	Setting/Testing All modes of operation Corrective maintenance / fault finding / troubleshooting Adjustment and setting or verification of functional parameters of the machine (selection of the attachment).

No.	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
23	<p>5.10.8.2 LID</p> <p><i>Trucks shall be fitted with a load indicating device, in order to warn the operator of instability and/or overloading whichever is the attachment fitted</i></p>	Tip-over	<p>Mechanism and function</p> <p>Parts</p> <p>Environment</p>	<p>Setting/testing</p> <p>All modes of operation</p> <p>Corrective maintenance / fault finding / trouble shooting</p> <p>Start-up / restart after unscheduled stop</p>
24	<p>5.10.8.3 Aligned configuration indicator</p> <p><i>Two different visual indications according to EN 842 shall be provided to indicate to the operator in normal operating position when the truck is in forward or rearward aligned configuration</i></p>	Inconsistency between steering controls and movement and forward/reverse direction controls and movement	<p>Mechanism and function</p> <p>Parts</p> <p>Environment</p>	<p>Setting/testing</p> <p>All modes of operation</p> <p>Corrective maintenance / fault finding / trouble shooting</p> <p>Start-up / restart after unscheduled stop</p>

**A.3 EN 1459-3**

	Paragraph of standard	Hazardous event	Areas of the machinery concerned	Tasks
18	<p>4.1 and 4.2 Locking of the work platform</p> <p><b>EN 1459-3</b></p> <p><i>The truck function shall change to MEWP function only when the work platform is:</i></p> <ul style="list-style-type: none"> <li>- <i>mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and</i></li> <li>- <i>locked and interlocked</i></li> </ul> <p>The safety related part of the control system (as defined in EN ISO 13849-1) performing the interlocking function shall comply with 4.6</p>	<p>Unintended disengagement of the platform from the truck. (without activation of any control).</p> <p>The disengagement can happen with the platform at height</p>	<p>Mechanism and function</p> <p>Parts</p>	<p>Assembly of the machine</p> <p>Connecting to power supply</p> <p>Fixing, anchoring</p> <p><del>Testing</del>-(covered by assembly and all modes of operation)</p> <p>all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)</p> <p><del>Dismantling/removal of parts, components, devices of the machine</del></p> <p>Recovering from control and protective devices failure</p> <p><del>Isolation and energy dissipation</del></p> <p><del>Rescue of trapped persons</del>-(not relevant to interlocking function)</p>



<p>19</p>	<p>4.3 Dismounting of the work platform from the truck</p> <p><b>EN 1459-3</b></p> <p><i>The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).</i></p>	<p>Disengagement of the platform from the truck. (actuated by an action on controls in the cab)</p> <p>The disengagement can happen with the platform at height</p>	<p>Mechanism and          function          Parts</p>	<p>Testing</p> <p>all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)</p> <p><del>Dismantling/removal of parts, components, devices of the machine</del></p> <p>Recovering from control and protective devices failure</p> <p><del>Isolation and energy dissipation</del></p>
-----------	--	---	---	---

## Annex B (informative)

### Numerical weighting of Risk Priority Number (RPN)

In the risk assessment process, specific numerical values are assigned to the parameters P, E and S depending on qualitative evaluations of the specific risk under assessment.

Probability	N umerical weighting
Almost impossible – possible only under extreme circumstances	0,033
Highly unlikely - though conceivable	1
Unlikely - but could occur	1,5
Possible – but unusual	2
Even chance - could happen	5
Probable - not surprising	8
Likely – only to be expected	10
Certain - no doubt	15

Exposure	N umerical weighting
Annually	0,5
Monthly	1
Weekly	1,5
Daly	2,5
Hourly	4
Constantly	5

Severity	Injuries or damage to the health of persons	N umerical weighting
0	insignificant (no injury or an injury such as a scratch or bruise with less than 3 days loss of work and total	0,1
I	insignificant (injury such as laceration or other mild ill-effect with less than 3 days loss of work and total	0,5
II	minor (injury with 3-56 days loss of work and total recovery – break of a minor bone or minor illness)	2
III	major (injury with more than 2 months loss of work and total recovery or permanent slight incapacity – break of a major bone or major illness)	4
IV	severe (injury/illness resulting in permanent incapacity – loss of one limb, eye, hearing loss)	6
V	severe (injury/illness resulting in permanent incapacity – loss of two limbs or eyes)	10
VI	fatality	15

Number of persons	N umerical weighting
1-2 persons	1
3-7 persons	2
8-15 persons	4
16-50 persons	8
50+ persons	12

**Legend:**

**Probability:** the possibility of the event occurring taking into account the possibility to avoid the harm.

**Exposure:** how often persons are exposed to the hazard

**Severity:** physical injury or damage to health that could "realistically" occur

## Annex C (informative)

### Risk priority number and corresponding performance level

The following table explains the RPN equivalent performance level and the required action.

Although similar to the Proctor Risk Assessment Calculator, [www.machinerysafety.co.uk](http://www.machinerysafety.co.uk), numbers were modified to account for the risk of machine mobility and the requirement of a minimum of 5 performance levels.

Correlation between PLs and RNP has been defined by the sub-group experts on the basis of the available literature and previous companies' experience.

NOTE If a Performance Level e is determined by risk assessment the system generally requires redesigning and / or further assessment.

Risk number	rating	PL	Risk	Action
1000	Unacceptable	PLe	High	the risk is unacceptable and cannot be justified on any grounds
501 – 1000	Extreme	PLe	Substantial	the risk should be reduced to a level as low as is reasonably practicable
301 – 500	Very high	PLd		
51 – 300	High	PLc		
10 – 50	Moderate	PLb	Moderate	the risk is tolerable if the scale of measures required to remove the risk is disproportionate to any improvement gained
6 – 9	Low			
2 – 5	Very low	PLa	Lo	the risk is broadly acceptable and no further precautions are needed
0 – 1	Extremely low	PLa		

## Annex D (informative)

### Comparison of risks prEN 1459-1 and EN 1459-2

This comparison was completed to ensure the risk assessment was not duplicated

NOTE Items are only strikethrough to corresponding with ref.no as shown in Annex A

Ref No.	Paragraph of standard prEN 1459-1	Hazardous event	Paragraph of standard EN 1459-2	Hazardous event
1	5.2.2 unintended movement	The machine moves inadvertently after starting	5.2.2 unintended movement	The machine moves inadvertently after starting <b>(Same risk)</b>
2	5.2.3 uncontrolled motion	The machine moves inadvertently from rest	5.2.3 uncontrolled motion	The machine moves inadvertently from rest <b>(Same risk)</b>
3a	5.2.4 powered travel movement	The machine moves inadvertently when the operator is not at the primary operating position	5.2.4 powered travel movement	The machine moves inadvertently when the operator is not at the primary operating position <b>(Same risk)</b>
3b	5.2.4 powered travel movement	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	5.2.4 powered travel movement	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control <b>(Same risk)</b>
3c	5.2.4 powered travel movement	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission.	5.2.4 powered travel movement	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission. <b>(Same risk)</b>

Ref No.	Paragraph of standard prEN 1459-1	Hazardous event	Paragraph of standard EN 1459-2	Hazardous event
4a	5.2.5 non activation of the parking brake	Operator is not warned that the parking brake is engaged.	5.2.5 non activation of the parking brake	Operator is not warned that the parking brake is engaged. <b>(Same risk)</b>
			5.5.1 f) prevent any powered movement	The machine or its elements move inadvertently when the operator is not at the primary operating position
4b	5.5.5 Multi-function controls – 2 <sup>nd</sup> para	Operator is not warned about mode of operation (dangerous movements)	No corresponding clause – these may need to be added	
4c	5.7 stabilizing devices 2 <sup>nd</sup> indent	Bystanders hit by stabilizers during travel mode		
4d	5.7 stabilizing devices 5 <sup>th</sup> indent	Loss of stability		
6a	5.5.1.1 multiple operating positions	Uncontrolled load movement	5.5.1.1 multiple operating positions	Uncontrolled load movement <b>(Same risk)</b>
6b	5.5.1.1 emergency stop	<del>Operable from all active operating positions</del>	5.5.1.1 emergency stop	<del>Operable from all active operating positions</del> <b>(Same risk)</b>
7	5.5.1.3 inadvertent activation	Uncontrolled load movement	5.5.1.3 inadvertent activation	Uncontrolled load movement <b>(Same risk)</b>
	5.5.2 differential locking	(when the control is not full mechanical) differential not locked, loss of motricity	5.5.2 differential locking	(when the control is not full mechanical) differential not locked, loss of motricity
8	<del>5.5.4.1 load handling controls – general</del>	Uncontrolled movement	<del>5.5.4.1 load handling controls – general</del>	<del>Uncontrolled movement</del> <b>(Same risk)</b>
8	5.5.4.2.1 control with detents	Unintended activation of auxiliary function	5.5.4.2.1 control with detents	Unintended activation of auxiliary function <b>(Same risk)</b>

Ref No.	Paragraph of standard prEN 1459-1	Hazardous event	Paragraph of standard EN 1459-2	Hazardous event
9	5.5.4.2.2 boom float control	Unintended lowering of the boom	5.5.4.2.2 boom float control	Unintended lowering of the boom <b>(Same risk)</b>
11	<del>5.5.5 Multi-function controls — 2<sup>nd</sup> para 5.10.7.1 and 5.10.7.2 control panels and control displays</del>		<del>5.5.5 Multi-function controls — 2<sup>nd</sup> para 5.10.7.1 and 5.10.7.2 control panels and control displays</del>	
			5.5.9 suspension locking	Tip over
10	5.7 stabilizing devices 1 <sup>st</sup> indent	Unintended movement of stabilizers	5.7 stabilizing devices 1 <sup>st</sup> indent	Unintended movement of stabilizers <b>(Same risk)</b>
13	<del>5.7 stabilizing devices 2<sup>nd</sup> indent</del>	<del>Bystanders hit by stabilizers during travel mode</del>	<del>5.7 stabilizing devices 2<sup>nd</sup> indent</del>	<del>Bystanders hit by stabilizers during travel mode</del> <b>(Same risk)</b>
15	<del>5.7 stabilizing devices 5<sup>th</sup> indent</del>	Tip over	<del>5.7 stabilizing devices 5<sup>th</sup> indent</del>	Tip over <b>(Same risk)</b>
16	<del>5.8.3 Tilttable cab support device 2<sup>nd</sup> para 5.12.3.3 movable guards</del>	<del>Disengagement of the cab Unintended movement</del>	<del>5.8.3 Tilttable cab support device, 2<sup>nd</sup> para</del>	<del>Unintended movement</del> <b>(Same risk)</b>
17	<del>5.10.5.6 doors and windows 4<sup>th</sup> paragraph</del>	<del>Take into account for RA, no PL required</del>		
			5.10.8.1.1 LDD General	Tip over
			5.10.8.1.2 Override of the LDD	Tip over (according to EN ISO 138469-1 § 5.2.5, override function shall have a PL such than the PL of the function it is related to is not reduced ).
			5.10.8.2 LID	Tip over
			5.10.8.3 Aligned configuration indicator	Unexpected steering. Tip over related to suspension locking.

<b>Ref No.</b>	<b>Paragraph of standard prEN 1459-1</b>	<b>Hazardous event</b>	<b>Paragraph of standard EN 1459-2</b>	<b>Hazardous event</b>
	C.2.3 Clutch pedal (if not mechanical or hydraulic)	Unintended motricity	B.2.3 Clutch pedal (if not mechanical or hydraulic)	Unintended motricity
	C.2.4 Accelerator pedal (if not mechanical or hydraulic)	Unintended speed	B.2.4 Accelerator pedal (if not mechanical or hydraulic)	Unintended speed
	C.2.5 Inching pedal (if not mechanical or hydraulic)	Unintended movement	B.2.5 Inching pedal (if not mechanical or hydraulic)	Unintended movement

## **Annex E** (informative)

### **Risk Estimation and Evaluation**

#### **E.1 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Operator**



N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
1.1	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Start up
1.2	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Start up
1.3	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Setting
1.4	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Restart after unscheduled stop
1.5	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Fault finding/troubleshooting
1.6	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Corrective maintenance
1.7	1	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Recovery of operation from jam

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	No device fitted to prevent drive system engagement.
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>Machine action resulting from failure of protective devices</b>	software error during setting
<b>control system</b>	<b>Machine action resulting from failure of protective devices</b>	resetting and testing is necessary before restart
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	jammed lever

RISK ESTIMATION				RISK EVALUATION		RISK REDUCTION	RISK ESTIMATION				RISK REDUCTION	
Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	4,0	0,5	1	4	LOW	Risk reduction device is not disproportional.	0,033	4	0,5	1	0,066	LOW
1	4,0	0,5	1	2	LOW	No other measures are needed						
1	0,5	0,5	1	0,25	LOW	No other measures are needed						
1	1,0	0,5	1	0,5	LOW	No other measures are needed						
1	0,5	0,5	1	0,25	LOW	No other measures are needed						
1	0,5	0,5	1	0,25	LOW	No other measures are needed						
1	0,5	0,5	1	0,25	LOW	No other measures are needed						

## E.2 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Co-worker

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
1.1	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
1.2	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
1.3	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
1.4	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Restart after unscheduled stop
1.5	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Fault finding/troubleshooting
1.6	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance
1.7	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Recovery of operation from jam

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
control system	Uncontrolled movements (including speed change)	No device fitted to prevent drive system engagement.
control system	Machine action resulting from inhibition (defeating or failure) of protective devices	
control system	Machine action resulting from failure of protective devices	software error during setting
control system	Machine action resulting from failure of protective devices	resetting and testing is necessary before restart
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	jammed lever

RISK ESTIMATION				RISK EVALUATION		RISK REDUCTION	RISK ESTIMATION				RISK REDUCTION	
P	E	S	N	Initial assessment		Risk reduction methods	Residual assessment				Risk rating number	Risk level
				Risk rating number	Risk level		P	E	S	N		
2	2,5	10,0	1	50	MODERATE	Trucks shall be fitted with a device that prevents the engine being started whilst the drive-system is engaged	0,033	2,5	10	1	0,825	LOW
1	0,5	10,0	1	5	LOW	No other measures are needed						
1	0,5	10,0	1	5	LOW	No other measures are needed						
1	1,0	10,0	1	10	MODERATE	Trucks shall be fitted with a device that prevents the engine being started whilst the drive-system is engaged	0,033	1	10	1	0,33	LOW
1	0,5	10,0	1	5	LOW	No other measures are needed						
1	0,5	10,0	1	5	LOW	No other measures are needed						
1	0,5	10,0	1	5	LOW	No other measures are needed						

### E.3 Hazard Identification Risk Estimation and Evaluation from 1.1. to 1.7 Bystander

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
1.1	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
1.2	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
1.4	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Restart after unscheduled stop
1.5	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Fault finding/troubleshooting
1.6	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance
1.7	1	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Recovery of operation from jam

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	The risk of the operator is related to the position of the machine (water, slopes, etc.)
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Situation: Event: Hazard: Additional notes:
<b>control system</b>	<b>Machine action resulting from failure of protective devices</b>	resetting and testing is necessary before restart
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	Situation: Event: Hazard: Additional notes:
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	jammed lever



RISK ESTIMATION				RISK EVALUATION		RISK REDUCTION	RISK ESTIMATION				RISK REDUCTION	
Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,0	10,0	1	15	MODERATE	Risk reduction device is not disproportional.	0,033	1	10	1	0,33	LOW
1	0,5	10,0	1	5	LOW	no other measures are needed						
1	0,5	10,0	1	5	LOW	no other measures are needed						
1	0,5	10,0	1	5	LOW	no other measures are needed						
1	0,5	10,0	1	5	LOW	no other measures are needed						
1	0,5	10,0	1	5	LOW	no other measures are needed						

#### E.4 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
2,1	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Start up
2,2	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Start up
2,3	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Setting
2,4	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Restart after unscheduled stop
2.5	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	all modes of operation (boom movement + rpm increase)
2.7	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Fault finding/troubleshooting
2.8	2	mechanical hazard	machinery mobility	being thrown impact trapping suffocation stubbing or puncture	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
control system	Uncontrolled movements (including speed change)	
control system	Machine action resulting from inhibition (defeating or failure) of protective devices	
control system	Machine action resulting from failure of protective devices	software error during setting
control system	Machine action resulting from failure of protective devices	resetting and testing is necessary before restart
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4,0	0,5	1	3	LOW	No other measures are needed						
1	4,0	0,5	1	2	LOW	No other measures are needed						
1	0,5	0,5	1	0,25	LOW	No other measures are needed						
1	1,0	0,5	1	0,5	LOW	No other measures are needed						
1	5,0	2,0	1	10	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged.	0,033	5,0	2,0	1	0,33	LOW
1	1,0	2,0	1	2	LOW	No other measures are needed						
1	1,0	2,0	1	2	LOW	No other measures are needed						

## E.5 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Co-worker

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
2,1	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
2,2	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
2,3	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
2,4	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Restart after unscheduled stop
2.5	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (boom movement + rpm increase)
2.6	2	mechanical hazard	machinery mobility	crushing impact	Mechanism and function-parts	all modes of operation (boom movement + rpm increase)
2.7	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Fault finding/troubleshooting
2.8	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
control system	Uncontrolled movements (including speed change)	
control system	Machine action resulting from inhibition (defeating or failure) of protective devices	
control system	Machine action resulting from failure of protective devices	software error during setting
control system	Machine action resulting from failure of protective devices	resetting and testing is necessary before restart
control system	Uncontrolled movements (including speed change)	
Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine, tools and materials used, processed, handled	Falling or ejection of objects	
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	2,5	10,0	1	37,5	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged	0,033	2,5	10	1	0,825	LOW	
1	0,5	10,0	1	5	LOW	No other measures are needed							
1	0,5	10,0	1	5	LOW	No other measures are needed							
1	1,0	10,0	1	10	MODERATE	Trucks shall be fitted with a device that prevents the engine being started whilst the drive-system is engaged	0,033	1	10	1	0,33	LOW	
1	2,5	10,0	1	25	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged.	0,033	2,5	10	1	0,825	LOW	
1	1,5	10,0	1	15	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged.	0,033	1,5	10,0	1	0,495	LOW	
1	0,5	10,0	1	5	LOW	No other measures are needed							
1	0,5	10,0	1	5	LOW	No other measures are needed							

## E.6 Hazard Identification Risk Estimation and Evaluation from 2.1. to 2.8 Bystander

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
2,1	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
2,2	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
2,4	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Restart after unscheduled stop
2,5	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (boom movement + rpm increase)
2,6	3	mechanical hazard	machinery mobility	crushing impact	Mechanism and function-parts	all modes of operation (boom movement + rpm increase)
2,7	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Fault finding/troubleshooting
2,8	2	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
control system	Uncontrolled movements (including speed change)	The risk of the operator is related to the position of the machine (water, slopes, etc.)
control system	Machine action resulting from inhibition (defeating or failure) of protective devices	Situation: Event: Hazard: Additional notes:
control system	Machine action resulting from failure of protective devices	resetting and testing is necessary before restart
control system	Uncontrolled movements (including speed change)	
Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine, tools and materials used, processed, handled	Falling or ejection of objects	
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	1,0	10,0	1	10	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged	0,033	1	10	1	0,33	LOW	
1	0,5	10,0	1	5	LOW	no other measures are needed							
1	0,5	10,0	1	5	LOW	no other measures are needed							
1	1,5	10,0	1	15	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged.	0,033	1,5	10	1	0,495	LOW	
1	1,0	10,0	1	10	MODERATE	The truck shall not move from rest on level ground until the drive system has been engaged.	0,033	1,0	10,0	1	0,33	LOW	
1	0,5	10,0	1	5	LOW	No other measures are needed							
1	0,5	10,0	1	5	LOW	No other measures are needed							

## E.7 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.1	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
3.2	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Testing
3.3	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)
3.4	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)
3.5	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	(machine set up) drive system engaged powered on
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	(daily checks) drive system engaged powered on
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	certain systems, like PTO and hydarulic attachment, cannot be connected when the engine is running.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	certain systems, like PTO and hydarulic attachment, cannot be connected when the engine is running.
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,5	6,0	1	<b>9</b>	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,5	6,0	1	<b>0,297</b>	LOW
1,5	2,5	6,0	1	<b>22,5</b>	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	2,5	6,0	1	<b>0,495</b>	LOW
1	2,5	15,0	1	<b>37,5</b>	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	2,5	15,0	1	<b>1,2375</b>	LOW
5	2,5	15,0	1	<b>187,5</b>	SUBSTANTIAL	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	2,5	15,0	1	<b>1,2375</b>	LOW
1	1,0	6,0	1	<b>6</b>	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,0	6,0	1	<b>0,198</b>	LOW

### E.8 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Co-worker

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.1	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
3.2	3a	mechanical hazard	machinery mobility	impact trapping	Mechanism and function-parts	Testing
3.3	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)
3.4	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)
3.5	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	(machine set up) drive system engaged powered on
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	(daily checks) drive system engaged powered on
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	certain systems, like PTO and hydraulic attachment, cannot be operated when the engine is running.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	certain systems, like PTO and hydraulic attachment, cannot be operated when the engine is running.
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,0	6,0	1	6	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,0	6,0	1	0,198	LOW
1,5	1,0	6,0	1	9	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,0	6,0	1	0,198	LOW
1	2,5	15,0	1	37,5	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	2,5	15,0	1	1,2375	LOW
5	2,5	15,0	1	187,5	SUBSTANTIAL	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	2,5	15,0	1	1,2375	LOW
1	1,0	6,0	1	6	MODERATE	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,0	6,0	1	0,198	LOW



## E.9 Hazard Identification Risk Estimation and Evaluation from 3.1. to 3.5 Bystander

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.2	3a	mechanical hazard	machinery mobility	impact trapping	Mechanism and function-parts	Testing
3.3	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)
3.4	3a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation (attachment functions and locking, trailers connection, PTO operations)

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	(daily checks) drive system engaged powered on
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	certain systems, like PTO and hydarulic attachment, cannot be operated when the engine is running.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	certain systems, like PTO and hydarulic attachment, cannot be operated when the engine is running.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	0,5	10,0	1	<b>7,5</b>	<b>MODERATE</b>	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	0,5	10,0	1	<b>0,165</b>	LOW
1	1,5	15,0	1	<b>22,5</b>	<b>MODERATE</b>	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,5	15,0	1	<b>0,7425</b>	LOW
1,5	1,0	10,0	1	<b>15</b>	<b>MODERATE</b>	Means shall be provided to prevent powered travel when the operator is not at the normal operator's position	0,033	1,0	10,0	1	<b>0,33</b>	LOW

**E.10 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.9 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.6	3b	mechanical hazard	machinery mobility	impact	Mechanism and function-parts	setting
3.7	3b	mechanical hazard	machinery mobility	impact	Mechanism and function-parts	Testing
3.8	3b	mechanical hazard	machinery mobility	impact	Mechanism and function-parts	all modes of operation
3.9	3b	mechanical hazard	machinery mobility	impact	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a. Operator is in the cab.
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
5	4	0,5	1	<b>10</b>	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	4	0,5	1	<b>0,066</b>	LOW	
5	2,5	0,5	1	<b>6,25</b>	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	2,5	0,5	1	<b>0,04125</b>	LOW	
5	4	0,5	1	<b>10</b>	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	4	0,5	1	<b>0,066</b>	LOW	
1	1	0,5	1	<b>0,5</b>	LOW	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	1	0,5	1	<b>0,0165</b>	LOW	

**E.11 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.9 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.6	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	setting
3.7	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Testing
3.8	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation
3.9	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	6	1	30	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	2,5	6	1	0,495	LOW
2	2,5	6	1	30	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	2,5	6	1	0,495	LOW
2	4	6	1	48	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	4	6	1	0,792	LOW
1	1,0	6,0	1	6	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	1,0	6,0	1	0,198	LOW

## **E.12 Hazard Identification Risk Estimation and Evaluation from 3.6. to 3.13 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.7	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Testing
3.8	3b	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	all modes of operation
3.10	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
3.12	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	testing
3.13	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	the machine has already fitted the means requested by 3a
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged.
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. Operator inside the cab
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. No other devices are fitted.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	10	1	10	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	1	10	1	0,33	LOW
1,5	1	10	1	15	MODERATE	Powered travel shall not occur automatically when the operator returns to the normal operator's position without an additional operation, e.g., by requiring resetting the direction control	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	1	10	1	0,33	LOW
1,5	1	10	1	15	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	1	10	1	0,33	LOW
8	1	10	1	80	SUBSTANTIAL	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	1	10	1	0,33	LOW

**E.13 Hazard Identification Risk Estimation and Evaluation from 3.10. to 3.13 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.10	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
3.11	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	setting
3.12	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	testing
3.13	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged.
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. Operator inside the cab
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. Operator inside the cab
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. No other devices are fitted.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	0,5	1	<b>2,5</b>	LOW	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	0,5	1	<b>0,04125</b>	LOW
2	2,5	0,5	1	<b>2,5</b>	LOW	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	0,5	1	<b>0,04125</b>	LOW
5	2,5	0,5	1	<b>6,25</b>	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	0,5	1	<b>0,04125</b>	LOW
8	4	6	1	<b>192</b>	SUBSTANTIAL	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	4	6	1	<b>0,792</b>	LOW



**E.14 Hazard Identification Risk Estimation and Evaluation from 3.10. to 3.13 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
3.10	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Start up
3.11	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	setting
3.12	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	testing
3.13	3c	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged.
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. Operator inside the cab
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. Operator inside the cab
<b>control system</b>	<b>Uncontrolled movements (including transmission that drives through the parking brake)</b>	The machine is considered not having devices that prevent the engine from starting if the transmission is engaged. No other devices are fitted.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	6	1	<b>13,5</b>	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	1,5	6	1	<b>0,297</b>	LOW
2	2,5	10	1	<b>50</b>	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	10	1	<b>0,825</b>	LOW
2	2,5	10	1	<b>50</b>	MODERATE	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	10	1	<b>0,825</b>	LOW
8	2,5	10	1	<b>200</b>	SUBSTANTIAL	Application of the parking brake shall apply neutral travel control, except on trucks with hydro-static transmission	0,033	2,5	10	1	<b>0,825</b>	LOW

**E.15 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.1	4a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
4.2	4a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Testing
4.3	4a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements. Other hazardous events due to failure(s) or poor design of the control system.</b>	The operator is not warned when the parking brake is not engaged. The operator's position is not known. Setting includes attachments fitting.
<b>control system</b>	<b>Uncontrolled movements. Other hazardous events due to failure(s) or poor design of the control system.</b>	The operator is not warned when the parking brake is not engaged. The operator's position is more known. High level of consciousness from the operator.
<b>control system</b>	<b>Uncontrolled movements.</b>	Normal operation conditions. The operator is not warned about not having engaged the parking brake. This item refers purely to the operator's behavior (operator doesn't activate the parking brake) <b>As this is an indicator, references are made to items 3a, 3b and 3c above, which give a PL c for the control system.</b>

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	2,5	10	1	37,5	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied. <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	2,5	10	1	25	MODERATE	
1	2,5	10	1	25	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied. <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	2,5	10	1	25	MODERATE	
2	2,5	10	1	50	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied. <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	2,5	10	1	25	MODERATE	

**E.16 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.1	4a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Setting
4.2	4a	mechanical hazard	machinery mobility	being run over crushing impact	Mechanism and function-parts	Testing
4.3	4a	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements. Other hazardous events due to failure(s) or poor design of the control system.</b>	The operator is not warned when the parking brake is not engaged. Setting includes attachments fitting. Coworker is able to avoid the hazardous event.
<b>control system</b>	<b>Uncontrolled movements. Other hazardous events due to failure(s) or poor design of the control system.</b>	The operator is not warned when the parking brake is not engaged. Position of the coworker is not known but he is able to avoid the hazardous event.
<b>control system</b>	<b>Uncontrolled movements.</b>	Normal operation conditions. The operator is not warned about not having engaged the parking brake. This item refers purely to the operator's behavior (operator doesn't activate the parking brake) <b>As this is an indicator, references are made to items 3a, 3b and 3c above, which give a PL c for the control system.</b>



				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	2,5	6	1	22,5	MODERATE	The operator is not warned when the parking brake is not engaged. The operator's position is not known. Setting includes attachments fitting.	1	2,5	6	1	15	MODERATE	
1,5	2,5	6	1	22,5	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied. <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	2,5	6	1	15	MODERATE	
1,5	1,5	10	1	22,5	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied. <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	1,5	10	1	15	MODERATE	

**E.17 Hazard Identification Risk Estimation and Evaluation from 4.1. to 4.3 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.3	4a	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Stopping of the machine

Hazardous events (ISO 12100: 2010, Table B.4)		Comments
Origin related to	Hazardous event	
control system	Uncontrolled movements.	Normal operation conditions. The operator is not warned about not having engaged the parking brake. This item refers purely to the operator's behavior (operator doesn't activate the parking brake) As this is an indicator, references are made to items 3a, 3b and 3c above, which give a PL c for the control system.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	22,5	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied.  <i>Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)</i>	1	1,5	10	1	15	MODERATE

**E.18 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.4	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Setting
4.5	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Testing
4.6	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Fault finding and trouble shooting
4.7	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Fault finding and trouble shooting
4.8	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations
4.9	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour</b>	The operator has no indication of which is the function selected. The error could lead to detachment of the attachment or load falling.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected. He is trying the controls for fault finding/troubleshooting
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour</b>	The operator has no indication of which is the function selected. The error could lead to detachment of the attachment or load falling.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	4	1	24	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	4	4	1	16	MODERATE
1,5	2,5	4	1	15	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	2,5	4	1	10	MODERATE
2	2,5	4	1	20	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	2,5	4	1	10	MODERATE
1,5	1	4	1	6	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1	4	1	4	LOW
1,5	4	4	1	24	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	4	4	1	16	MODERATE
2	4	4	1	32	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	4	4	1	16	MODERATE

**E.19 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.4	4b	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Setting
4.5	4b	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Testing
4.6	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Fault finding and trouble shooting
4.7	4b	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Fault finding and trouble shooting
4.8	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations
4.9	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour</b>	The operator has no indication of which is the function selected. The error could lead to detachment of the attachment or load falling.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected. He is trying the controls for fault finding/troubleshooting
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour</b>	The operator has no indication of which is the function selected. The error could lead to detachment of the attachment or load falling.



				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	22,5	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1,5	10	1	15	MODERATE
1,5	1	10	1	15	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1	10	1	10	MODERATE
1,5	1	10	1	15	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1	10	1	10	MODERATE
1,5	1	10	1	15	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1	10	1	10	MODERATE
1,5	2,5	10	1	37,5	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	2,5	10	1	25	MODERATE
1,5	2,5	10	1	37,5	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	2,5	10	1	25	MODERATE

**E.20 Hazard Identification Risk Estimation and Evaluation from 4.4. to 4.9 bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.3	4a	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Stopping of the machine
4.8	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations
4.9	4b	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements.</b>	<p>Normal operation conditions. The operator is not warned about not having engaged the parking brake.</p> <p>This item refers purely to the operator's behavior (operator doesn't activate the parking brake)</p> <p>As this is an indicator, references are made to items 3a, 3b and 3c above, which give a PL c for the control system.</p>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication of which is the function selected.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour</b>	<p>The operator has no indication of which is the function selected.</p> <p>The error could lead to detachment of the attachment or load falling.</p>

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	22,5	MODERATE	A warning shall be activated when the operator is not at the normal operator's position and the parking brake has not been applied.  Note: the residual assessment shows that the risk could be lowered if other measures are added (not only a warning)	1	1,5	10	1	15	MODERATE
1,5	1,5	10	1	22,5	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1,5	10	1	15	MODERATE
1,5	1,5	10	1	22,5	MODERATE	Visual indication shall be provided to inform the operator of the selected mode(s) of operation.	1	1,5	10	1	15	MODERATE

**E.21 Hazard Identification Risk Estimation and Evaluation from 4.10. to 4.15 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.10	4c	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	all modes of operations
4.11	4c	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	testing/setting
4.14	4d	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Setting
4.15	4d	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine,</b>	<b>falling or ejection of objects</b>	The operator has no indication of the position of the stabilizers. The stabilizers can come into contact with obstacles (e.g. scaffolding)
<b>Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine,</b>	<b>falling or ejection of objects</b>	The operator has no indication of the position of the stabilizers. The stabilizers can come into contact with obstacles (e.g. scaffolding)
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication about the correct position of stabilizers. The machine could tip over
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication about the correct position of stabilizers. The machine could tip over

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	2	1	12	MODERATE	Means shall be provided to the operator to indicate that the stabilising devices are in a safe travelling position when moving the truck.	1	4	2	1	8	MODERATE
1,5	2,5	2	1	7,5	MODERATE	Means shall be provided to the operator to indicate that the stabilising devices are in a safe travelling position when moving the truck.	1	2,5	2	1	5	LOW
2	4	2	1	16	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	4	2	1	8	MODERATE
2	2,5	2	1	10	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	2,5	2	1	5	LOW

**E.22 Hazard Identification Risk Estimation and Evaluation from 4.12. to 4.16 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.12	4c	mechanical hazard	machinery mobility	impact; crushing slipping, tripping, falling	Mechanism and function-parts	All modes of operation
4.13	4c	mechanical hazard	machinery mobility	impact; crushing slipping, tripping, falling	Mechanism and function-parts	Setting/testing
4.14	4d	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	Setting
4.15	4d	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	Testing
4.16	4d	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	all modes of operation



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Shape and/or superficial finishing of accessible parts of the machine</b>	<b>Contact with sharp edges and corners, protruding parts</b>	The operator has no indication of the position of the stabilizers. The stabilizers can come into contact with coworker
<b>Shape and/or superficial finishing of accessible parts of the machine</b>	<b>Contact with sharp edges and corners, protruding parts</b>	The operator has no indication of the position of the stabilizers. The stabilizers can come into contact with coworker
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication about the correct position of stabilizers. The machine could tip over
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator has no indication about the correct position of stabilizers. The machine could tip over
<b>Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine, tools and materials used, processed, handled</b>	<b>Falling or ejection of objects</b>	The operator has no indication about the correct position of stabilizers. The machine could lose the load because of its instability

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	2	1	10	MODERATE	Means shall be provided to the operator to indicate that the stabilising devices are in a safe travelling position when moving the truck.	1,5	2,5	2	1	7,5	MODERATE
2	2,5	2	1	10	MODERATE	Means shall be provided to the operator to indicate that the stabilising devices are in a safe travelling position when moving the truck.	1,5	2,5	2	1	7,5	MODERATE
2	2,5	10	1	50	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	2,5	10	1	25	MODERATE
1,5	2,5	10	1	37,5	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	2,5	10	1	25	MODERATE
2	2,5	10	1	50	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	2,5	10	1	25	MODERATE

**E.23 Hazard Identification Risk Estimation and Evaluation from 4.12. Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
4.12	4c	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	all modes of operations
4.16	4d	mechanical hazard	machinery mobility	impact; being run over crushing slipping, tripping, falling	Mechanism and function-parts	all modes of operation

Hazardous events (ISO 12100: 2010, Table B.4)		Comments
Origin related to	Hazardous event	
Shape and/or superficial finishing of accessible parts of the machine	Contact with sharp edges and corners, protruding parts	The operator has no indication of the position of the stabilizers. The stabilizers can come into contact with bystander
Kinetic energy and/or potential energy (gravity) of the machine, parts of the machine, tools and materials used, processed, handled	Falling or ejection of objects	The operator has no indication about the correct position of stabilizers. The machine could lose the load because of its instability

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1,5	4	1	12	MODERATE	Means shall be provided to the operator to indicate that the stabilising devices are in a safe travelling position when moving the truck.	1,5	1,5	4	1	9	MODERATE
1,5	1	10	1	15	MODERATE	An indication shall be given to the operator (e.g. sensors, painted marks, etc) when each stabilising device is extended to level and/or support the truck in conformity with the load chart(s).	1	1	10	1	10	MODERATE

## E.24 Hazard Identification Risk Estimation and Evaluation from 6.1. to 6.5 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.1	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	setting
6.2	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting
6.3	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	setting
6.4	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	testing
6.5	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements (including speed change)</b>	The two or more control positions are enabled simultaneously. Each position is unaware of the other's ability to control.
<b>control system</b>	<b>falling or ejection of objects</b>	The operators can do different movements simultaneously.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator can move stabilizers or make boom movements which can lead to instability
<b>control system</b>	<b>Unintended/unexpected start-up. Uncontrolled movements (including speed change)</b>	The two or more control positions are enabled simultaneously. Each position is unaware of the other's ability to control.
<b>control system</b>	<b>falling or ejection of objects</b>	The operators can do different movements simultaneously.

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
2	2,5	6	1	<b>30</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW	
1,5	2,5	10	1	<b>37,5</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	10	1	<b>0,825</b>	LOW	
1,5	2,5	10	1	<b>37,5</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	10	1	<b>0,825</b>	LOW	
1	2,5	6	1	<b>15</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW	
1	2,5	6	1	<b>15</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW	

## E.25 Hazard Identification Risk Estimation and Evaluation from 6.1. to 6.5 Co-worker

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.1	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	setting
6.2	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting
6.3	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	setting
6.4	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	testing
6.5	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	testing



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements (including speed change)</b>	The two or more control positions are enabled simultaneously. Each position is unaware of the other's ability to control.
<b>control system</b>	<b>falling or ejection of objects</b>	The operators can do different movements simultaneously.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator can move stabilizers or make boom movements which can lead to instability
<b>control system</b>	<b>Unintended/unexpected start-up. Uncontrolled movements (including speed change)</b>	The two or more control positions are enabled simultaneously. Each position is unaware of the other's ability to control.
<b>control system</b>	<b>falling or ejection of objects</b>	The operators can do different movements simultaneously.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	6	1	<b>30</b>	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW
1,5	2,5	10	1	<b>37,5</b>	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	10	1	<b>0,825</b>	LOW
1,5	2,5	10	1	<b>37,5</b>	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	10	1	<b>0,825</b>	LOW
1	2,5	6	1	<b>15</b>	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW
1	2,5	6	1	<b>15</b>	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	<b>0,495</b>	LOW

**E.26 Hazard Identification Risk Estimation and Evaluation from 6.4. to 6.9 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.4	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	testing
6.5	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	testing
6.6	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	testing
6.7	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	all modes of operation
6.8	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	all modes of operation
6.9	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected start-up. Uncontrolled movements (including speed change)</b>	The two or more control positions are enabled simultaneously. Each position is unaware of the other's ability to control.
<b>control system</b>	<b>falling or ejection of objects</b>	The operators can do different movements simultaneously.
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator can move stabilizers or make boom movements which can lead to instability
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements (including speed change)</b>	The machine is normally working. Two or more control positions are enabled simultaneously
<b>control system</b>	<b>falling or ejection of objects</b>	The machine is normally working. Two or more control positions are enabled simultaneously
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The machine is normally working. Two or more control positions are enabled simultaneously

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1,5	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1,5	10	1	0,495	LOW
1	1,5	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1,5	10	1	0,495	LOW
1	1,5	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1,5	10	1	0,495	LOW

**E.27 Hazard Identification Risk Estimation and Evaluation from 6.6. to 6.10 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.6	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	testing
6.7	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	all modes of operation
6.8	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	all modes of operation
6.9	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	all modes of operation
6.10	6a	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator can move stabilizers or make boom movements which can lead to instability
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements (including speed change)</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>control system</b>	<b>falling or ejection of objects</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>control system</b>	<b>Unintended/unexpected stop</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other doesn't expect the machine to stop.

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	2,5	6	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	0,495	LOW
2	4	6	1	48	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	6	1	0,792	LOW
1,5	4	10	1	60	SUBSTANTIAL	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	6	1	0,792	LOW
1,5	4	10	1	60	SUBSTANTIAL	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	10	1	1,32	LOW
1,5	4	2	1	12	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	2	1	0,264	LOW



**E.28 Hazard Identification Risk Estimation and Evaluation from 6.6. to 6.10 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.6	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	testing
6.7	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	all modes of operation
6.8	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	all modes of operation
6.9	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	all modes of operation
6.10	6a	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	stopping of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The operator can move stabilizers or make boom movements which can lead to instability
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements (including speed change)</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>control system</b>	<b>falling or ejection of objects</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	The machine is normally working. Two ore more control positions are enabled simultaneously
<b>control system</b>	<b>Unintended/unexpected stop</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other doesn't expect the machine to stop.

				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	2,5	6	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	2,5	6	1	0,495	LOW	
2	4	6	1	48	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	6	1	0,792	LOW	
1,5	4	10	1	60	SUBSTANTIAL	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	10	1	1,32	LOW	
1,5	4	10	1	60	SUBSTANTIAL	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	10	1	1,32	LOW	
1,5	4	2	1	12	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	2	1	0,264	LOW	

### E.29 Hazard Identification Risk Estimation and Evaluation from 6.10. to 6.15 Bystander

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.10	6a	mechanical hazard	machinery mobility	impact;	Mechanism and function-parts	stopping of the machine
6.11	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine
6.12	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine in case of emergency
6.13	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	stopping of the machine in case of emergency
6.14	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	stopping of the machine in case of emergency
6.15	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	Restart after unscheduled stop

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected stop</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other doesn't expect the machine to stop.
<b>control system</b>	<b>failure to stop moving parts Uncontrolled movements</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other keeps it moving.
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>control system</b>	<b>falling or ejection of objects</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	The machine has stopped in an emergency situation, the second control position starts it up again.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,5	2	1	3	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1,5	2	1	0,099	LOW
1	1,5	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1,5	10	1	0,495	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	0,5	10	1	5	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	0,5	10	1	0,165	LOW
1	0,5	10	1	5	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	0,5	10	1	0,165	LOW
1	0,5	10	1	5	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	0,5	10	1	0,165	LOW

**E.30 Hazard Identification Risk Estimation and Evaluation from 6.11. to 6.14 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.11	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine
6.12	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine in case of emergency
6.13	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	stopping of the machine in case of emergency
6.14	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	stopping of the machine in case of emergency

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>failure to stop moving parts Uncontrolled movements</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other keeps it moving.
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>control system</b>	<b>falling or ejection of objects</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	One control position stops the machine in an hazard and the other control position starts it up again



				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	4	10	1	<b>60</b>	<b>SUBSTANTIAL</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	10	1	<b>1,32</b>	LOW	
1,5	1	10	1	<b>15</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	<b>0,33</b>	LOW	
1	1	10	1	<b>10</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	<b>0,33</b>	LOW	
1	1	10	1	<b>10</b>	<b>MODERATE</b>	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	<b>0,33</b>	LOW	

**E.31 Hazard Identification Risk Estimation and Evaluation from 6.11. to 6.14 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.11	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine
6.12	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	stopping of the machine in case of emergency
6.13	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	stopping of the machine in case of emergency
6.14	6a	mechanical hazard	instability	crushing	Mechanism and function-parts	stopping of the machine in case of emergency

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>failure to stop moving parts Uncontrolled movements</b>	Two ore more control positions are enabled simultaneously. One position stops the machine whilst the other keeps it moving.
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>control system</b>	<b>falling or ejection of objects</b>	One control position stops the machine in an hazard and the other control position starts it up again
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	One control position stops the machine in an hazard and the other control position starts it up again

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	10	1	60	SUBSTANTIAL	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	4	10	1	1,32	LOW
1,5	1	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW

**E.32 Hazard Identification Risk Estimation and Evaluation from 6.15. to 6.18 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.15	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	Restart after unscheduled stop
6.16	6a	mechanical hazard	machinery mobility	being thrown impact;	Mechanism and function-parts	Fault finding/troubleshooting
6.17	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	Fault finding/troubleshooting
6.18	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	Fault finding/troubleshooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	The machine has stopped in an emergency situation, the second control position starts it up again.
<b>control system</b>	<b>Unintended/unexpected start-up</b>	Troubleshooting with the engine off and power on.
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>falling or ejection of objects</b>	

				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	1	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW	
1	1	2	1	2	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	2	1	0,066	LOW	
1,5	1	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW	
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW	

**E.33 Hazard Identification Risk Estimation and Evaluation from 6.15. to 6.18 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
6.15	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	Restart after unscheduled stop
6.16	6a	mechanical hazard	machinery mobility	being thrown impact;	Mechanism and function-parts	Fault finding/troubleshooting
6.17	6a	mechanical hazard	machinery mobility	being run over; crushing; impact;	Mechanism and function-parts	Fault finding/troubleshooting
6.18	6a	mechanical hazard	falling objects	impact	Mechanism and function-parts	Fault finding/troubleshooting



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Unintended/unexpected start-up Uncontrolled movements</b>	The machine has stopped in an emergency situation, the second control position starts it up again.
<b>control system</b>	<b>Unintended/unexpected start-up</b>	Troubleshooting with the engine off and power on.
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>falling or ejection of objects</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	2	1	2	LOW	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	2	1	0,066	LOW
1,5	1	10	1	15	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	If more than one operator's position is fitted, the use of the controls at one operator's position shall preclude the use of the controls at other operator's positions.	0,033	1	10	1	0,33	LOW

**E.34 Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.10 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
7.1	7	mechanical hazard	machinery mobility	being thrown impact	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.4	7	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.5	7	mechanical hazard	machinery mobility	being thrown impact	Mechanism and function Parts	Start up and restart after unscheduled stop
7.6	7	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function Parts	Start up and restart after unscheduled stop
7.9	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	Corrective maintenance
7.10	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	Failure of the deactivating device (e.g button to disable joystick movements for roading functions)
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	this is applicable to only such devices like dead-man handle/button
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	Failure of the deactivating device (e.g button to disable joystick movements for roading functions)
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	this is applicable to only such devices like dead-man handle/button
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	2	1	12	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	1	4	2	1	8	MODERATE
2	4	2	1	16	MODERATE	Controls, that can cause a hazard due to inadvertent activation, shall be so arranged, deactivated or guarded as to minimise the risk of injury, in particular when the operator gets into or out of the normal operator's position.	0,033	4	2	1	0,264	LOW
1,5	2,5	2	1	7,5	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	1	2,5	2	1	5	LOW
2	2,5	2	1	10	MODERATE	Controls, that can cause a hazard due to inadvertent activation, shall be so arranged, deactivated or guarded as to minimise the risk of injury, in particular when the operator gets into or out of the normal operator's position.	0,033	2,5	2	1	0,165	LOW
1	1	10	1	10	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	10	1	0,33	LOW
1	1	6	1	6	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	6	1	0,198	LOW

**E.35 Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.5 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
7.1	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.2	7	mechanical hazard	falling objects	crushing impact	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.3	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.5	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	Start up and restart after unscheduled stop

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	2,5	10	1	25	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	10	1	0,825	LOW	
1	2,5	15	1	37,5	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	15	1	1,2375	LOW	
1	2,5	6	1	15	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	6	1	0,495	LOW	
1	2,5	10	1	25	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	10	1	0,825	LOW	



**E.36 Hazard Identification Risk Estimation and Evaluation from 7.1. to 7.8 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
7.1	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.2	7	mechanical hazard	falling objects	crushing impact	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.3	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	all modes of operation (boom lifting, lowering, extending, retracting, fork tilting, attachment locking, attachment functions, stabilizers, levelling, steering, forward and reverse travelling)
7.5	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	Start up and restart after unscheduled stop
7.7	7	mechanical hazard	falling objects	crushing impact	Mechanism and function Parts	Start up and restart after unscheduled stop
7.8	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	Start up and restart after unscheduled stop



Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	1,5	15	1	22,5	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1,5	15	1	0,7425	LOW	
1	1,5	15	1	22,5	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1,5	15	1	0,7425	LOW	
1	1,5	10	1	15	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1,5	10	1	0,495	LOW	
1	1	15	1	15	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	15	1	0,495	LOW	
1	1	15	1	15	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	15	1	0,495	LOW	
1	1	10	1	10	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	10	1	0,33	LOW	

**E.37 Hazard Identification Risk Estimation and Evaluation from 7.6. to 7.10 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
7.7	7	mechanical hazard	falling objects	crushing impact	Mechanism and function Parts	Start up and restart after unscheduled stop
7.8	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	Start up and restart after unscheduled stop
7.9	7	mechanical hazard	machinery mobility	being thrown impact being run over	Mechanism and function Parts	Corrective maintenance
7.10	7	mechanical hazard	moving elements	crushing impact	Mechanism and function Parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	2,5	15	1	<b>37,5</b>	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	15	1	<b>1,2375</b>	LOW
1	2,5	6	1	<b>15</b>	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	2,5	6	1	<b>0,495</b>	LOW
1	1	10	1	<b>10</b>	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	10	1	<b>0,33</b>	LOW
1	1	6	1	<b>6</b>	MODERATE	The deactivation device shall either be self-acting or acting by compulsory activation of the relevant device. Proper design of deactivating device shall fail safe and be unoperable.	0,033	1	6	1	<b>0,198</b>	LOW

**E.38 Hazard Identification Risk Estimation and Evaluation from 8.1. to 8.7 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.1	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	process/tool changeover
8.2	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	process/tool changeover
8.3	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	process/tool changeover
8.7	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	2,5	6	1	<b>22,5</b>	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	<b>0,495</b>	LOW
1,5	2,5	10	1	<b>37,5</b>	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	10	1	<b>0,825</b>	LOW
1,5	2,5	6	1	<b>22,5</b>	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	<b>0,495</b>	LOW
1	2,5	10	1	<b>25</b>	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	10	1	<b>0,825</b>	LOW

**E.39 Hazard Identification Risk Estimation and Evaluation from 8.1. to 8.4 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.1	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	process/tool changeover
8.2	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	process/tool changeover
8.3	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	process/tool changeover
8.4	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	start up

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	2,5	6	1	22,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW
1,5	2,5	10	1	37,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	10	1	0,825	LOW
1,5	2,5	6	1	22,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW
1,5	1,5	6	1	13,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1,5	6	1	0,297	LOW

**E.40 Hazard Identification Risk Estimation and Evaluation from 8.2. to 8.5 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.2	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	process/tool changeover
8.5	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	start up

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>unintended/unexpected start up</b>	
<b>control system</b>	<b>unintended/unexpected start up</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	15	1	15	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	15	1	0,495	LOW
1	1	15	1	15	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	15	1	0,495	LOW

**E.41 Hazard Identification Risk Estimation and Evaluation from 8.8 to 8.12 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.8	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage
8.9	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage
8.10	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	Corrective maintenance
8.11	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	Corrective maintenance
8.12	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	Corrective maintenance



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	6	1	30	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW
2	2,5	6	1	30	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW
1	1	10	1	10	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	10	1	0,33	LOW
1,5	1	6	1	9	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	6	1	0,198	LOW
1,5	1	6	1	9	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	6	1	0,198	LOW

**E.42 Hazard Identification Risk Estimation and Evaluation from 8.5. to 8.8 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.5	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	start up
8.6	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	start up
8.7	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage
8.8	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>unintended/unexpected start up</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	22,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1,5	10	1	0,495	LOW
1,5	1,5	6	1	13,5	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1,5	6	1	0,297	LOW
1	2,5	10	1	25	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	10	1	0,825	LOW
2	2,5	6	1	30	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW

**E.43 Hazard Identification Risk Estimation and Evaluation from 8.9. to 8.12 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
8.9	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	removal of product from machine recovery of operation from jam or blockage
8.10	8	mechanical hazard	falling objects	impact crushing	Mechanism and function Parts	Corrective maintenance
8.11	8	mechanical hazard	moving elements	drawing-in or trapping entanglement;	Mechanism and function Parts	Corrective maintenance
8.12	8	mechanical hazard	cutting parts	cutting or severing	Mechanism and function Parts	Corrective maintenance

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended activation of auxiliary function

Initial assessment					Risk rating number	Risk level	Risk reduction methods	Residual assessment					
P	E	S	N	P				E	S	N	Risk rating number	Risk level	
2	2,5	6	1	30	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	2,5	6	1	0,495	LOW	
1	1	10	1	10	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	10	1	0,33	LOW	
1,5	1	6	1	9	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	6	1	0,198	LOW	
1,5	1	6	1	9	MODERATE	The detent mode shall: <input type="checkbox"/> be automatically deactivated when the truck is switched off and not be automatically activated when the truck is switched on; or <input type="checkbox"/> prevent the truck from being restarted until the detent mode is deactivated	0,033	1	6	1	0,198	LOW	



**E.44 Hazard Identification Risk Estimation and Evaluation from 9.1. to 9.6 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
9.1	9	mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	Start-up / restart after unscheduled stop
9.2		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)
9.3		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)
9.4		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)
9.5		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	corrective maintenance / fault finding / trouble shooting
9.6		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended lowering of the boom when boom float control is engaged. Failure of the deactivation device
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended lowering of the boom when boom float control is engaged. Failure of the deactivation device
<b>control system</b>	<b>– Uncontrolled movements (including speed change)</b>	Unintended lowering of the boom when boom float control is engaged.
<b>control system</b>	<b>Human errors/misbehaviour</b>	Unintended operation of the boom float control.
<b>control system</b>	<b>machine action resulting from inhibition (defeating or failure) of protective devices</b>	Unintended lowering of the boom when boom float control is engaged
<b>control system</b>	<b>– Uncontrolled movements (including speed change)</b>	Unintended lowering of the boom when boom float control is engaged

				Initial assessment		Risk reduction methods	Residual assessment						Status
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level	
1,5	2,5	15	1	56,25	SUBSTANTIAL	For trucks equipped with boom float control, unintended lowering of the boom shall be protected against. In addition to 5.5.4.2.1	0,033	2,5	15	1	1,2375	LOW	Complete
1,5	4	15	1	90	SUBSTANTIAL	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	4	15	1	1,98	LOW	Complete
1,5	4	15	1	90	SUBSTANTIAL	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	4	15	1	1,98	LOW	Complete
2	2,5	15	1	75	SUBSTANTIAL	Design of the boom float control requires two actions therefore likelihood of the error is reduced significantly. Information for use.	0,033	2,5	15	1	1,2375	LOW	Complete
1,5	1	15	1	22,5	MODERATE	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	1	15	1	0,495	LOW	Complete
1,5	1	15	1	22,5	MODERATE	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	1	15	1	0,495	LOW	Complete

**E.45 Hazard Identification Risk Estimation and Evaluation from 9.1. to 9.4 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
9.1	9	mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	Start-up / restart after unscheduled stop
9.2		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)
9.3		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)
9.4		mechanical hazard	moving elements / gravity	crushing and impact	Mechanism and function Parts	all modes of operation (boom raising and lowering)

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	machine action resulting from inhibition (defeating or failure) of protective devices	Unintended lowering of the boom when boom float control is engaged. Failure of the deactivation device
<b>control system</b>	machine action resulting from inhibition (defeating or failure) of protective devices	Unintended lowering of the boom when boom float control is engaged. Failure of the deactivation device
<b>control system</b>	– Uncontrolled movements (including speed change)	Unintended lowering of the boom when boom float control is engaged.
<b>control system</b>	Human errors/misbehaviour	Unintended operation of the boom float control.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	15	1	33,75	MODERATE	For trucks equipped with boom float control, unintended lowering of the boom shall be protected against. In addition to 5.5.4.2.1	0,033	1,5	15	1	0,7425	LOW
1,5	1,5	15	1	33,75	MODERATE	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	1,5	15	1	0,7425	LOW
1,5	1,5	15	1	33,75	MODERATE	the boom float control mode shall be automatically deactivated when: <input type="checkbox"/> the boom raising/lowering control is operated	0,033	1,5	15	1	0,7425	LOW
2	1,5	15	1	45	MODERATE	Design of the boom float control requires two actions therefore likelihood of the error is reduced significantly. Information for use.	0,033	1,5	15	1	0,7425	LOW

**E.46 Hazard Identification Risk Estimation and Evaluation 10.2 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)		Hazardous events (ISO 12100: 2010, Table B.4)		Comments
		Type or group of hazard	Origin <small>One origin of hazards can have several potential consequences</small>	Potential consequences <small>For each type or group of hazard, some potential consequences can be related with several origins of hazards</small>	Areas of the machinery concerned	Tasks	Origin related to	Hazardous event	
10.2	10	mechanical hazard	instability	crushing, impact	Mechanism and function Parts	all modes of operation	Stability of the machine and/or parts of the machine	Loss of stability	Unintended movement of stabilizers from failure of interlocking devices

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	2	1	12	MODERATE	When stabilising devices are provided - Stabilising devices shall be fitted with interlocking devices, e.g., load holding valves which keep them in position in case of hose failure or oil leakage	0,033	4	2	1	0,264	LOW

**E.47 Hazard Identification Risk Estimation and Evaluation from 10.1 to 10.2 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
10.1	10	mechanical hazard	falling objects, gravity	crushing, impact	Mechanism and function Parts	all modes of operation
10.2	10	mechanical hazard	instability	crushing, impact	Mechanism and function Parts	all modes of operation



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Dropping of a moving part</b>	Unintended movement of stabilizers from failure of interlocking devices
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	Unintended movement of stabilizers from failure of interlocking devices

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	2,5	6	1	<b>22,5</b>	<b>MODERATE</b>	When stabilising devices are provided - Stabilising devices shall be fitted with interlocking devices, e.g., load holding valves which keep them in position in case of hose failure or oil leakage	0,033	2,5	6	1	<b>0,495</b>	LOW
1	2,5	15	1	<b>37,5</b>	<b>MODERATE</b>	When stabilising devices are provided - Stabilising devices shall be fitted with interlocking devices, e.g., load holding valves which keep them in position in case of hose failure or oil leakage	0,033	2,5	15	1	<b>1,2375</b>	LOW

**E.48 Hazard Identification Risk Estimation and Evaluation 10.2 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
10.1	10	mechanical hazard	falling objects, gravity	crushing, impact	Mechanism and function Parts	all modes of operation
10.2	10	mechanical hazard	instability	crushing, impact	Mechanism and function Parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	Dropping of a moving part	Unintended movement of stabilizers from failure of interlocking devices
<b>Stability of the machine and/or parts of the machine</b>	Loss of stability	Unintended movement of stabilizers from failure of interlocking devices

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	6	1	9	MODERATE	When stabilising devices are provided - Stabilising devices shall be fitted with interlocking devices, e.g., load holding valves which keep them in position in case of hose failure or oil leakage	0,033	1	6	1	0,198	LOW
1	1	15	1	15	MODERATE	When stabilising devices are provided - Stabilising devices shall be fitted with interlocking devices, e.g., load holding valves which keep them in position in case of hose failure or oil leakage	0,033	1	15	1	0,495	LOW

**E.49 Hazard Identification Risk Estimation and Evaluation from 18.1 to 18.4 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.1	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	assembly of the machine
18.2	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Connecting to power supply
18.3	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Fixing, anchoring
18.4	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Wrong assembly of the platform + truck allows powered movements of the platform when not secured.
<b>control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	Electrical connection fails to recognize the platform is not interlocked.
<b>Mechanical strength of parts of the machine, tools</b>	<b>Break-up during operation</b>	Truck fails to recognize the platform is not secured due to mechanical failure of securing mechanism.
<b>Mechanical strength of parts of the machine, tools</b>	<b>Break-up during operation</b>	Truck fails to recognize the platform is not secured due to mechanical failure of securing mechanism.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1,5	15	2	90	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	15	2	1,485	LOW
1,5	1,5	15	2	67,5	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	15	2	1,485	LOW
1	1,5	15	2	45	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	15	2	1,485	LOW
1	4	15	2	120	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	15	2	3,96	LOW



**E.50 Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.17 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.13	18	mechanical hazard	moving elements	impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.14	18	mechanical hazard	moving elements	impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.15	18	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function-parts	assembly of the machine
18.16	18	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function-parts	Fixing, anchoring
18.17	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	assembly of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Failure to stop moving parts</b>	boom movement (not machine movement) and platform movements (including rotating platform). It is intended the platform to be close to the ground.
<b>potential energy (gravity) of the machine, parts of the machine</b>	<b>falling or ejection of objects</b>	boom movement (not machine movement) and platform movements (including rotating platform). It is intended the platform to be close to the ground.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Difficulty of assembly. It is intended the platform to be close to the ground.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Difficulty of assembly. It is intended the platform to be close to the ground.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Wrong assembly of the platform + truck allows powered movements of the platform when not secured.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	4	6	1	24	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	6	1	0,792	LOW
1	4	6	1	24	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	6	1	0,792	LOW
1	1,5	6	1	9	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	6	1	0,297	LOW
1	1,5	6	1	9	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	6	1	0,297	LOW
1,5	1,5	6	1	13,5	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	6	1	0,297	LOW

### E.51 Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.21 Bystander

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.13	18	mechanical hazard	moving elements	impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
18.14	18	mechanical hazard	moving elements	impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
18.20	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
18.21	18a	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform

<b>Hazardous events</b> (ISO 12100: 2010, Table B.4)		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Failure to stop moving parts</b>	boom movement (not machine movement) and platform movements (including rotating platform)
<b>potential energy (gravity) of the machine, parts of the machine</b>	<b>falling or ejection of objects</b>	boom movement (not machine movement) and platform movements (including rotating platform)
<b>falling or ejection of objects</b>	Falling of the platform itself	impact
<b>Dropping or ejection of a moving part of the machine</b>	Falling of the platform itself	Truck doesn't recognize that the platform is not interlocked

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	6	1	6	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	6	1	0,198	LOW
1	1	6	1	6	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	6	1	0,198	LOW
1	1	15	1	15	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	10	1	0,33	LOW
1	1	15	1	15	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	6	1	0,198	LOW

## E.52 Hazard Identification Risk Estimation and Evaluation from 18.4 to 18.8 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.5	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.6	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.7	18	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure
18.8	18	mechanical hazard	instability;	being thrown slipping, tripping and falling	Mechanism and function-parts	assembly of the machine

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>potential energy (gravity) of the machine, parts of the machine</b>	<b>falling or ejection of objects</b>	Falling of the platform itself
<b>control system</b>	<b>Dropping or ejection of a moving part of the machine</b>	Truck doesn't recognize that the platform is not interlocked
<b>control system</b>	<b>Unintended/unexpected start-up</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems)



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	4	15	2	240	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	15	2	3,96	LOW
1,5	4	15	2	180	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	15	2	3,96	LOW
1	1	15	2	30	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	15	2	0,99	LOW
2	1,5	2	2	12	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	2	2	0,198	LOW

**E.53 Hazard Identification Risk Estimation and Evaluation from 18.18 to 18.22 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.18	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Connecting to power supply
18.19	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Fixing, anchoring
18.20	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.21	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.22	18	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Recovering from control and protective devices failure

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	Electrical connection fails to recognize the platform is not interlocked.
<b>Mechanical strength of parts of the machine, tools</b>	<b>Break-up during operation</b>	Truck fails to recognize the platform is not secured due to mechanical failure of securing mechanism.
<b>falling or ejection of objects</b>	<b>Falling of the platform itself</b>	impact
<b>Dropping or ejection of a moving part of the machine</b>	<b>Falling of the platform itself</b>	Truck doesn't recognize that the platform is not interlocked
<b>Machine action resulting from inhibition (defeating or failure) of protective devices</b>	<b>Unintended/unexpected start-up</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,5	6	1	9	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	6	1	0,297	LOW
1	1,5	6	1	9	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	6	1	0,297	LOW
1,5	4	15	1	90	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	10	1	1,32	LOW
1,5	4	15	1	90	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	6	1	0,792	LOW
1	1	6	1	6	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	6	1	0,198	LOW

**E.54 Hazard Identification Risk Estimation and Evaluation from 18.9 to 18.12 Operator**

Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
	Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18	mechanical hazard	instability;	being thrown slipping, tripping and falling	Mechanism and function-parts	Fixing, anchoring
18	mechanical hazard	instability;	being thrown slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
18	mechanical hazard	instability;	being thrown slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
18	mechanical hazard	instability;	being thrown slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Mechanical strength of parts of the machine, tools</b>	<b>Break-up during operation</b>	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems)
<b>potential energy (gravity) of the machine, parts of the machine</b>	<b>falling or ejection of objects</b>	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems)
<b>control system</b>	<b>Dropping or ejection of a moving part of the machine</b>	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems)
<b>control system</b>	<b>Unintended/unexpected start-up</b>	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems)

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,5	2	2	6	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	2	2	0,198	LOW
2	4	2	2	32	MODERATE	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	2	2	0,528	LOW
1	1	2	2	4	LOW	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	2	2	0,132	LOW
1	1	2	2	4	LOW	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1	2	2	0,132	LOW

**E.55 Hazard Identification Risk Estimation and Evaluation from 18.13 to 18.16 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
18.13	18	mechanical hazard	moving elements	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.14	18	mechanical hazard	moving elements	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
18.15	18	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function-parts	assembly of the machine
18.16	18	Ergonomic hazards	design, location or identification of control devices	any other (for example, mechanical, electrical) as a consequence of a human error	Mechanism and function-parts	Fixing, anchoring



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Failure to stop moving parts</b>	boom movement (not machine movement) and platform movements (including rotating platform)
<b>potential energy (gravity) of the machine, parts of the machine</b>	<b>falling or ejection of objects</b>	boom movement (not machine movement) and platform movements (including rotating platform)
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Difficulty of assembly
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	Difficulty of assembly

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	4	15	2	180	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	15	2	3,96	LOW
2	4	15	2	240	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	4	15	2	3,96	LOW
2	1,5	15	2	90	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	15	2	1,485	LOW
2	1,5	15	2	90	SUBSTANTIAL	The truck function shall change to MEWP function only when the work platform is: - mechanically, electrically and, if necessary for the operation of any SRP/CS (see EN ISO 13849-1) fitted to the platform, hydraulically fitted to the truck; and - locked and interlocked	0,033	1,5	15	2	1,485	LOW

**E.56 Hazard Identification Risk Estimation and Evaluation from 19.1 to 19.4 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
19.1	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	testing
19.2	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	testing
19.3	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
19.4	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing.
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	2,5	10	1	25	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	10	1	0,825	LOW
2	2,5	10	1	50	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	10	1	0,825	LOW
1	4	15	2	120	SUBSTANTIAL	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	4	15	2	3,96	LOW
2	4	15	2	240	SUBSTANTIAL	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	4	15	2	3,96	LOW

**E.57 Hazard Identification Risk Estimation and Evaluation from 19.9 to 19.13 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin <small>One origin of hazards can have several potential consequences</small>	Potential consequences <small>For each type or group of hazard, some potential consequences can be related with several origins of hazards</small>	Areas of the machinery concerned	Tasks
19.9	19	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	testing
19.10	19	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
19.11	19	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
19.12	19	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Recovering from control and protective devices failure
19.13	19	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Recovering from control and protective devices failure

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1,5	10	1	30	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1,5	10	1	0,495	LOW
1	2,5	15	1	37,5	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	15	1	1,2375	LOW
2	2,5	15	1	75	SUBSTANTIAL	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	15	1	1,2375	LOW
1	1	10	1	10	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	1	0,33	LOW



**E.58 Hazard Identification Risk Estimation and Evaluation from 19.10 to 19.13 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
19.10	19	mechanical hazard	falling objects	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
19.11	19	mechanical hazard	falling objects	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform
19.12	19	mechanical hazard	falling objects	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure
19.13	19	mechanical hazard	falling objects	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
<b>Control system</b>	<b>Machine action resulting from inhibition (failure) of protective devices</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	15	1	15	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	15	1	0,495	LOW
1	1	15	1	15	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	15	1	0,495	LOW
1	1	10	1	10	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	1	0,33	LOW
1	1	10	1	10	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	1	0,33	LOW

### E.59 Hazard Identification Risk Estimation and Evaluation from 19.5 to 19.16 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
19.5	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure
19.6	19	mechanical hazard	height from the ground	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure
19.15	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	testing
19.16	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	testing

Hazardous events (ISO 12100: 2010, Table B.4)		Comments
Origin related to	Hazardous event	
Control system	Machine action resulting from inhibition (failure) of protective devices	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
Workstation and/or work process design	Human errors/misbehaviour (unintentional and/or deliberately induced by the design)	The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing
Control system	Machine action resulting from inhibition (failure) of protective devices	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing.
Workstation and/or work process design	Human errors/misbehaviour (unintentional and/or deliberately induced by the design)	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck. The platform height is considered to be low during testing.

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	1	10	2	20	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	2	0,66	LOW	
2	1	10	2	40	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	10	2	0,66	LOW	
1	2,5	2	1	5	LOW	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	2	1	0,165	LOW	
2	2,5	2	1	10	MODERATE	The dismounting of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	2,5	2	1	0,165	LOW	

## E.60 Hazard Identification Risk Estimation and Evaluation from 19.17 to 19.20 Operator

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
19.17	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
19.18	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	all modes of operation (boom lifting, lowering, extending, retracting, attachment functions, levelling of platform)
19.19	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure
19.20	19	mechanical hazard	instability;	being thrown impact slipping, tripping and falling	Mechanism and function-parts	Recovering from control and protective devices failure

Hazardous events (ISO 12100: 2010, Table B.4)		Comments
Origin related to	Hazardous event	
Control system	Machine action resulting from inhibition (failure) of protective devices	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
Workstation and/or work process design	Human errors/misbehaviour (unintentional and/or deliberately induced by the design)	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
Control system	Machine action resulting from inhibition (failure) of protective devices	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.
Workstation and/or work process design	Human errors/misbehaviour (unintentional and/or deliberately induced by the design)	instability of the platform, possibility for the operator to recover himself (not wearing restrain systems). The operator has to change the mode function from MEWP to truck (otherwise the cab controls are disabled, according prEN1459-1) and then has to unintentionally activate the control in the cab to disengage the platform from the truck.



				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1	4	2	2	16	MODERATE	The dismantling of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	4	2	2	0,528	LOW	
2	4	2	2	32	MODERATE	The dismantling of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	4	2	2	0,528	LOW	
1	1	2	2	4	LOW	The dismantling of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	2	2	0,132	LOW	
2	1	2	2	8	MODERATE	The dismantling of the work platform from the truck shall require two separate intentional actions (e.g. one to unlock and a second to dismount).	0,033	1	2	2	0,132	LOW	

**E.61 Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.1	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	setting/testing
20.2	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	setting/testing
20.3	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	setting/testing
20.4	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing
20.5	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Operation: slewing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	the operator is not at normal operating position
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	1,5	10	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	10	1	0,495	LOW	
1	1,5	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	15	1	0,7425	LOW	
1	1,5	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	15	1	0,7425	LOW	
2	1,5	10	1	30	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	10	1	0,495	LOW	
1,5	4	10	1	60	SUBSTANTIAL	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	4	10	1	1,32	LOW	

**E.62 Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.1	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	setting/testing
20.2	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	setting/testing
20.3	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	setting/testing
20.4	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing
20.5	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Operation: slewing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	

				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	1	10	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	10	1	0,33	LOW	
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW	
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW	
2	1,5	15	1	45	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	15	1	0,7425	LOW	
1,5	2,5	10	1	37,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	10	1	0,825	LOW	

**E.63 Hazard Identification Risk Estimation and Evaluation from 20.1 to 20.5 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.1	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	setting/testing
20.2	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	setting/testing
20.3	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	setting/testing
20.4	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing
20.5	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Operation: slewing



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	10	1	10	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	10	1	0,33	LOW
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1,5	1	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1	1	10	1	10	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	10	1	0,33	LOW

**E.64 Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.6	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Operation: slewing
20.7	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Operation: slewing
20.8	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing
20.9	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	process/tool changeover
20.10	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	process/tool changeover

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	the operator is not at normal operating position
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	4	15	1	60	SUBSTANTIAL	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	4	15	1	1,98	LOW
1	4	15	1	60	SUBSTANTIAL	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	4	15	1	1,98	LOW
2	4	10	1	80	SUBSTANTIAL	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	4	10	1	1,32	LOW
1,5	2,5	10	1	37,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	10	1	0,825	LOW
1	2,5	15	1	37,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	15	1	1,2375	LOW

**E.65 Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.6	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Operation: slewing
20.7	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Operation: slewing
20.8	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing
20.9	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	process/tool changeover
20.10	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	process/tool changeover

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	2,5	15	1	<b>37,5</b>	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	15	1	<b>1,2375</b>	LOW
1	2,5	15	1	<b>37,5</b>	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	15	1	<b>1,2375</b>	LOW
2	2,5	15	1	<b>75</b>	SUBSTANTIAL	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	15	1	<b>1,2375</b>	LOW
1,5	1,5	10	1	<b>22,5</b>	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	10	1	<b>0,495</b>	LOW
1,5	1,5	15	1	<b>33,75</b>	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	15	1	<b>0,7425</b>	LOW



**E.66 Hazard Identification Risk Estimation and Evaluation from 20.6 to 20.10 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.6	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Operation: slewing
20.7	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Operation: slewing
20.8	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	testing
20.9	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	process/tool changeover
20.10	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	process/tool changeover

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	For bystanders only testing is considered
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1	1	15	1	15	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1,5	1	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1	0,5	10	1	5	LOW	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	10	1	0,165	LOW
1	0,5	15	1	7,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	15	1	0,2475	LOW

**E.67 Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.11	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	process/tool changeover
20.12	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.13	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.14	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.15	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>control system</b>	<b>Uncontrolled movements</b>	the operator is not at normal operating position
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	the operator is not at normal operating position
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	the operator is not at normal operating position

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	2,5	15	1	<b>37,5</b>	<b>MODERATE</b>	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	2,5	15	1	<b>1,2375</b>	LOW
2	1	10	1	<b>20</b>	<b>MODERATE</b>	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	10	1	<b>0,33</b>	LOW
1,5	1	15	1	<b>22,5</b>	<b>MODERATE</b>	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	<b>0,495</b>	LOW
1,5	1	15	1	<b>22,5</b>	<b>MODERATE</b>	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	<b>0,495</b>	LOW
2	1	15	1	<b>30</b>	<b>MODERATE</b>	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	<b>0,495</b>	LOW

**E.68 Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.11	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	process/tool changeover
20.12	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.13	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.14	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.15	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	



				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	1,5	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1,5	15	1	0,7425	LOW
2	1	10	1	20	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	10	1	0,33	LOW
1,5	1	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
1,5	1	15	1	22,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW
2	1	15	1	30	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	1	15	1	0,495	LOW

**E.69 Hazard Identification Risk Estimation and Evaluation from 20.11 to 20.15 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
20.11	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	process/tool changeover
20.12	20	mechanical hazard	rotating elements	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.13	20	mechanical hazard	rotating elements	crushing	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.14	20	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
20.15	20	mechanical hazard	falling objects	impact	Mechanism and function-parts	setting/testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>control system</b>	<b>Uncontrolled movements</b>	
<b>Stability of the machine and/or parts of the machine</b>	<b>Loss of stability</b>	
<b>Kinetic energy and/or potential energy</b>	<b>falling or ejection of objects</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1	0,5	15	1	7,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	15	1	0,2475	LOW
1	0,5	10	1	5	LOW	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	10	1	0,165	LOW
1	0,5	15	1	7,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	15	1	0,2475	LOW
1	0,5	15	1	7,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	15	1	0,2475	LOW
1	0,5	15	1	7,5	MODERATE	means shall be provided to prevent any powered movement by actuating the controls if the operator is not at an operating position.	0,033	0,5	15	1	0,2475	LOW

**E.70 Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.5 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.1	21	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	setting/testing
21.2	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	setting/testing
21.4	21	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	all modes of operation
21.5	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	6	1	9	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	6	1	0,198	LOW
2	1	6	1	12	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	6	1	0,198	LOW
1,5	2,5	6	1	22,5	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	2,5	6	1	0,495	LOW
2	2,5	6	1	30	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	2,5	6	1	0,495	LOW

**E.71 Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.4 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.1	21	mechanical hazard	instability	crushing impact	Mechanism and function-parts	setting/testing
21.2	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	setting/testing
21.3	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	setting/testing
21.4	21	mechanical hazard	instability	crushing impact	Mechanism and function-parts	all modes of operation



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	10	1	15	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	6	1	12	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	6	1	0,198	LOW
1,5	1	10	1	15	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW
1,5	1,5	10	1	22,5	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1,5	10	1	0,495	LOW

**E.72 Hazard Identification Risk Estimation and Evaluation from 21.1 to 21.3 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.1	21	mechanical hazard	instability	crushing impact	Mechanism and function-parts	setting/testing
21.2	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	setting/testing
21.3	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	setting/testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	0,5	15	1	<b>11,25</b>	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	0,5	15	1	<b>0,2475</b>	LOW
2	0,5	10	1	<b>10</b>	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	0,5	10	1	<b>0,165</b>	LOW
1,5	0,5	10	1	<b>7,5</b>	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	0,5	10	1	<b>0,165</b>	LOW

**E.73 Hazard Identification Risk Estimation and Evaluation from 21.6 to 21.9 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.7	21	mechanical hazard	instability	being thrown impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
21.8	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
21.9	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW



**E.74 Hazard Identification Risk Estimation and Evaluation from 21.5 to 21.9 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.5	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	all modes of operation
21.6	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation
21.7	21	mechanical hazard	instability	crushing impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
21.8	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
21.9	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	

Initial assessment							Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
2	2,5	6	1	30	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	2,5	6	1	0,495	LOW	
2	2,5	10	1	50	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	2,5	10	1	0,825	LOW	
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW	
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW	
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW	

**E.75 Hazard Identification Risk Estimation and Evaluation from 21.4 to 21.6 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
21.4	21	mechanical hazard	instability	crushing impact	Mechanism and function-parts	all modes of operation
21.5	21	mechanical hazard	moving elements	impact	Mechanism and function-parts	all modes of operation
21.6	21	mechanical hazard	falling objects	crushing impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>control system</b>	<b>uncontrolled movements</b>	
<b>control system</b>	<b>uncontrolled movements</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	15	1	22,5	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	15	1	0,495	LOW
2	1	10	1	20	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	15	1	30	MODERATE	means shall be provided to automatically lock the suspension when the slewing upper structure is not in forward or rearward aligned position or the boom is lifted at a height greater than the one corresponding to the travel position as defined by the manufacturer	0,033	1	15	1	0,495	LOW

**E.76 Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.5 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.1	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.2	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22a.3	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.4	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22a.5	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	the operator is in the cab
<b>stability of the machine</b>	<b>Loss of stability</b>	the operator is in the cab
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	the operator is in the cab (misuse of the machine)
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	the operator is in the cab (misuse of the machine)
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	the operator in this case might be not in his primary operating position



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	4	4	1	32	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	4	4	1	0,528	LOW
5	4	4	1	80	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	4	4	1	0,528	LOW
8	1,5	4	1	48	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1,5	4	1	0,198	LOW
8	1,5	4	1	48	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1,5	4	1	0,198	LOW
2	1	10	1	20	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	0,33	LOW

**E.77 Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.5 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.1	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.2	22a	mechanical hazard	instability	crushing, impact	Mechanism and function-parts	all modes of operation
22a.3	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.4	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22a.5	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	10	1	<b>50</b>	<b>MODERATE</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	2,5	10	1	<b>0,825</b>	LOW
5	2,5	15	1	<b>187,5</b>	<b>SUBSTANTIAL</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	2,5	15	1	<b>1,2375</b>	LOW
8	1	10	1	<b>80</b>	<b>SUBSTANTIAL</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	<b>0,33</b>	LOW
8	1	15	1	<b>120</b>	<b>SUBSTANTIAL</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	<b>0,495</b>	LOW
2	1	10	1	<b>20</b>	<b>MODERATE</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	<b>0,33</b>	LOW

**E.78 Hazard Identification Risk Estimation and Evaluation from 22a.1 to 22a.4 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.1	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.2	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22a.3	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22a.4	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	10	1	20	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	0,33	LOW
5	1	15	1	75	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	0,495	LOW
8	0,5	10	1	40	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	0,5	10	1	0,165	LOW
8	0,5	15	1	60	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	0,5	15	1	0,2475	LOW

**E.79 Hazard Identification Risk Estimation and Evaluation from 22a.6 to 22a.10 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.6	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22a.7	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.8	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.9	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.10	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>stability of the machine</b>	<b>Loss of stability</b>	the operator in this case might be not in his primary operating position
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	the operator is in the cab
<b>stability of the machine</b>	<b>Loss of stability</b>	the operator is in the cab
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	the operator is in the cab (misuse of the machine)
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	the operator is in the cab (misuse of the machine)

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	15	1	30	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	0,495	LOW
2	4	4	1	32	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	4	4	1	0,528	LOW
5	4	4	1	80	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	4	4	1	0,528	LOW
8	1,5	4	1	48	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1,5	4	1	0,198	LOW
8	1,5	4	1	48	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1,5	4	1	0,198	LOW

**E.80 Hazard Identification Risk Estimation and Evaluation from 22a.6 to 22a.10 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.6	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22a.7	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.8	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.9	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.10	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	15	1	<b>30</b>	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	<b>0,495</b>	LOW
2	2,5	10	1	<b>50</b>	MODERATE	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	2,5	10	1	<b>0,825</b>	LOW
5	2,5	15	1	<b>187,5</b>	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	2,5	15	1	<b>1,2375</b>	LOW
8	1	10	1	<b>80</b>	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	<b>0,33</b>	LOW
8	1	15	1	<b>120</b>	SUBSTANTIAL	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	<b>0,495</b>	LOW

**E.81 Hazard Identification Risk Estimation and Evaluation from 22a.7 to 22a.10 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22a.7	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.8	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.9	22a	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop
22a.10	22a	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Start-up / restart after unscheduled stop

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>Mechanical strength of parts of the machine</b>	<b>Break-up during operation</b>	
<b>stability of the machine</b>	<b>Loss of stability</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	
<b>Workstation and/or work process design</b>	<b>Human errors/misbehaviour (unintentional and/or deliberately induced by the design)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	10	1	<b>20</b>	<b>MODERATE</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	10	1	<b>0,33</b>	LOW
5	1	15	1	<b>75</b>	<b>SUBSTANTIAL</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	1	15	1	<b>0,495</b>	LOW
8	0,5	10	1	<b>40</b>	<b>MODERATE</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	0,5	10	1	<b>0,165</b>	LOW
8	0,5	15	1	<b>60</b>	<b>SUBSTANTIAL</b>	Trucks shall be fitted with a load limiting device, in order to prevent instability and/or overloading whichever is the attachment fitted	0,033	0,5	15	1	<b>0,2475</b>	LOW



**E.82 Hazard Identification Risk Estimation and Evaluation from 22b.1 to 22b.4 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.1	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.2	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing
22b.3	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.4	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	the operator could be in the cab
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	4	1	6	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	4	1	0,132	LOW
2	1	4	1	8	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	4	1	0,132	LOW
1,5	1	6	1	9	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW
2	1	6	1	12	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW

**E.83 Hazard Identification Risk Estimation and Evaluation from 22b.1 to 22b.4 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.1	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.2	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing
22b.3	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.4	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	10	1	15	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	10	1	20	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW
1,5	1	10	1	15	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW
2	1	10	1	20	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW

**E.84 Hazard Identification Risk Estimation and Evaluation from 22b.7 to 22b.9 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.7	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.8	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22b.9	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	22,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	10	1	0,495	LOW
1,5	1,5	10	1	22,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	10	1	0,495	LOW
1,5	1,5	10	1	22,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	10	1	0,495	LOW

**E.85 Hazard Identification Risk Estimation and Evaluation from 22b.5 to 22b.8 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.5	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.6	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing
22b.7	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.8	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	
control system	Failure to stop moving parts	we assume that the probability of a failure of LLD with PLc is highly unlikely
control system	Failure to stop moving parts	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
5	1	6	1	30	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW
5	1,5	6	1	45	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	6	1	0,297	LOW
1,5	4	6	1	36	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW
1,5	4	6	1	36	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW

**E.86 Hazard Identification Risk Estimation and Evaluation from 22b.5 to 22b.8 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.5	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing
22b.6	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing
22b.7	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.8	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	
control system	Failure to stop moving parts	
control system	Failure to stop moving parts	

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
5	1	10	1	50	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW
5	1,5	10	1	75	SUBSTANTIAL	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	10	1	0,495	LOW
1,5	2,5	10	1	37,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	10	1	0,825	LOW
1,5	2,5	10	1	37,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	10	1	0,825	LOW

**E.87 Hazard Identification Risk Estimation and Evaluation from 22b.10 to 22b.12 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.10	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22b.11	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.12	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1,5	10	1	<b>22,5</b>	<b>MODERATE</b>	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	10	1	<b>0,495</b>	LOW
5	1,5	15	1	<b>112,5</b>	<b>SUBSTANTIAL</b>	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	15	1	<b>0,7425</b>	LOW
5	1,5	15	1	<b>112,5</b>	<b>SUBSTANTIAL</b>	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1,5	15	1	<b>0,7425</b>	LOW

**E.88 Hazard Identification Risk Estimation and Evaluation from 22b.9 to 22b.12 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.9	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.10	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22b.11	22b	mechanical hazard	falling objects	impact	Mechanism and function-parts	all modes of operation
22b.12	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	

assessment				N	Risk rating	Risk level	Risk reduction methods	final assessment				Risk	Risk level
P	E	S	P					E	S	N			
1,5	4	6	1	36	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW	
1,5	4	6	1	36	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW	
5	4	6	1	120	SUBSTANTIAL	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW	
5	4	6	1	120	SUBSTANTIAL	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	4	6	1	0,792	LOW	

**E.89 Hazard Identification Risk Estimation and Evaluation from 22b.9 to 22b.13 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.9	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.10	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22b.11	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22b.12	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22b.13	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	The system on slewing machines is not so easy to defeat (usually it's a position control), there is no operational advantage on tamper it. The operator of a slewing telehandler is supposed to be a well trained person.
control system	Machine action resulting from inhibition (defeating or failure) of protective device	The system on slewing machines is not so easy to defeat (usually it's a position control), there is no operational advantage on tamper it. The operator of a slewing telehandler is supposed to be a well trained person.
control system	Failure to stop moving parts	

				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	2,5	10	1	37,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	10	1	0,825	LOW	
1,5	2,5	10	1	37,5	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	10	1	0,825	LOW	
5	2,5	10	1	125	SUBSTANTIAL	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	10	1	0,825	LOW	
5	2,5	15	1	187,5	SUBSTANTIAL	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	2,5	15	1	1,2375	LOW	
1,5	1	6	1	9	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW	



**E.90 Hazard Identification Risk Estimation and Evaluation from 22b.13 to 22b.15 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.13	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.14	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.15	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Failure to stop moving parts</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	

				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	4	1	6	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	4	1	0,132	LOW
1,5	1	4	1	6	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	4	1	0,132	LOW
1,5	1	6	1	9	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW

**E.91 Hazard Identification Risk Estimation and Evaluation from 22b.14 to 22b.18 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.14	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.15	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.16	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.17	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.18	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
control system	Failure to stop moving parts	
control system	Uncontrolled movements (including speed change)	
control system	Uncontrolled movements (including speed change)	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	
control system	Machine action resulting from inhibition (defeating or failure) of protective device	

				Initial assessment			Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level	P		E	S	N	Risk rating number	Risk level	
1,5	1	6	1	9	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW	
1,5	1	10	1	15	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW	
1,5	1	10	1	15	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW	
5	1	10	1	50	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW	
5	1	10	1	50	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW	

**E.92 Hazard Identification Risk Estimation and Evaluation from 22b.16 to 22b.18 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22b.16	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.17	22b	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22b.18	22b	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Uncontrolled movements (including speed change)</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	
<b>control system</b>	<b>Machine action resulting from inhibition (defeating or failure) of protective device</b>	



				Initial assessment		Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	6	1	9	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	6	1	0,198	LOW
5	1	10	1	50	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW
5	1	10	1	50	MODERATE	The LLD shall operate automatically and without the need for resetting when triggered. The LLD, once triggered, shall remain triggered until the overload condition has been removed or the overturning moment has been lessened within the limits permitted by the manufacturer	0,033	1	10	1	0,33	LOW

**E.93 Hazard Identification Risk Estimation and Evaluation from 22c.1 to 22c.3 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22c.1	22.c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22c.2	22.c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22c.3	22c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the operator knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the operator knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	2	1	4	LOW	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	2	1	0,066	LOW
2	1	2	1	4	LOW	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	2	1	0,066	LOW
2	4	2	1	16	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	4	2	1	0,264	LOW

**E.94 Hazard Identification Risk Estimation and Evaluation from 22c.1 to 22c.3 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22c.1	22.c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22c.2	22.c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22c.3	22c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the coworker knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the coworker knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	10	1	15	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	10	1	0,33	LOW
2	1	15	1	30	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	10	1	0,33	LOW
2	2,5	10	1	50	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	2,5	10	1	0,825	LOW

**E.95 Hazard Identification Risk Estimation and Evaluation from 22c.3 to 22c.4 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22c.3	22c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22c.4	22c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation



<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1,5	10	1	30	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1,5	10	1	0,495	LOW
2	1,5	15	1	45	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1,5	15	1	0,7425	LOW

**E.96 Hazard Identification Risk Estimation and Evaluation from 22c.4 to 22c.6 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22c.4	22c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22c.5	22c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22c.6	22c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	4	2	1	16	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	4	2	1	0,264	LOW
2	1	6	1	12	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	6	1	0,198	LOW
2	1	6	1	12	MODERATE	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	6	1	0,198	LOW

**E.97 Hazard Identification Risk Estimation and Evaluation from 22c.4 to 22c.6 Co-worker**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22c.4	22c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22c.5	22c	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22c.6	22c	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	2,5	15	1	<b>75</b>	<b>SUBSTANTIAL</b>	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	2,5	10	1	<b>0,825</b>	LOW
2	1	10	1	<b>20</b>	<b>MODERATE</b>	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	10	1	<b>0,33</b>	LOW
2	1	15	1	<b>30</b>	<b>MODERATE</b>	Where a truck can be operated in different configurations of wheels, stabilising devices, or slewing angle range, the proper selection of correct LLD settings for the actual configuration shall be automatic and their modification by the operator shall not be possible. This requirement does not cover the interchange of attachment fitted on the load carriage	0,033	1	10	1	<b>0,33</b>	LOW



**E.98 Hazard Identification Risk Estimation and Evaluation from 22d.1 to 22d.6 Operator**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22d.1	22.d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22d.2	22.d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22d.3	22.d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22d.4	22.d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22d.5	22.d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22d.6	22.d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the operator knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the operator knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1	2	1	4	LOW	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	2	1	0,066	LOW
2	1	2	1	4	LOW	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	2	1	0,066	LOW
2	4	2	1	16	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	4	2	1	0,264	LOW
2	4	2	1	16	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	4	2	1	0,264	LOW
2	1	6	1	12	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	6	1	0,198	LOW
2	1	6	1	12	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	6	1	0,198	LOW

### E.99 Hazard Identification Risk Estimation and Evaluation from 22d.1 to 22d.6 Co-worker

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22d.1	22d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22d.2	22d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	setting/testing (Adjustment and setting or verification of functional parameters of the machine)
22d.3	22d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22d.4	22d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation
22d.5	22d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting
22d.6	22d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	Corrective maintenance / fault finding / trouble shooting

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		
<b>Origin related to</b>	<b>Hazardous event</b>	<b>Comments</b>
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the coworker knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The risks are limited because during this task the coworker knows that the system may work not properly and he pays special care.
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	The operator could be out of the cab in this case

Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
1,5	1	10	1	15	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	10	1	0,33	LOW
2	1	15	1	30	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	10	1	0,33	LOW
2	2,5	10	1	50	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	2,5	10	1	0,825	LOW
2	2,5	15	1	75	SUBSTANTIAL	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	2,5	10	1	0,825	LOW
2	1	10	1	20	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	10	1	0,33	LOW
2	1	15	1	30	MODERATE	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1	10	1	0,33	LOW

**E.100 Hazard Identification Risk Estimation and Evaluation from 22d.3 to 22d.4 Bystander**

N°	Ref. no.	Hazards (ISO 12100: 2010, Table B.1)			Hazardous situations (ISO 12100: 2010, Table B.3)	
		Type or group of hazard	Origin One origin of hazards can have several potential consequences	Potential consequences For each type or group of hazard, some potential consequences can be related with several origins of hazards	Areas of the machinery concerned	Tasks
22d.3	22d	mechanical hazard	falling objects	crushing, impact	Mechanism and function-parts	all modes of operation
22d.4	22d	mechanical hazard	instability	being thrown, impact	Mechanism and function-parts	all modes of operation

<b>Hazardous events (ISO 12100: 2010, Table B.4)</b>		<b>Comments</b>
<b>Origin related to</b>	<b>Hazardous event</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	
<b>control system</b>	<b>Other hazardous events due to failure(s) or poor design of the control system</b>	



Initial assessment						Risk reduction methods	Residual assessment					
P	E	S	N	Risk rating number	Risk level		P	E	S	N	Risk rating number	Risk level
2	1,5	10	1	<b>30</b>	<b>MODERATE</b>	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1,5	10	1	<b>0,495</b>	LOW
2	1,5	15	1	<b>45</b>	<b>MODERATE</b>	When the truck is intended to be used with attachments having different rated capacities, an attachment selector may allow the operator to set the LLD with reference to the attachment used	0,033	1,5	15	1	<b>0,7425</b>	LOW

N°	RISK ESTIMATION				RISK EVALUATION		operator		
	Initial assessment				Risk rating number	Risk level	coworker		
	P	E	S	N			bystander		
1	1.1	2	2,5	10	1	50	MODERATE	PLb	PLb
	1.2	1	0,5	10	1	5	LOW	PLa	
	1.3	1	0,5	10	1	5	LOW	PLa	
	1.4	1	1	10	1	10	MODERATE	PLb	
	1.5	1	0,5	10	1	5	LOW	PLa	
	1.6	1	0,5	10	1	5	LOW	PLa	
	1.7	1	0,5	10	1	5	LOW	PLa	
2	2.1	1,5	2,5	10	1	37,5	MODERATE	PLb	PLb
	2.2	1	0,5	10	1	5	LOW	PLa	
	2.3	1	0,5	10	1	5	LOW	PLa	
	2.4	1	1,0	10,0	1	10	MODERATE	PLb	
	2.5	1	2,5	10	1	25	MODERATE	PLb	
	2.6	1	1,5	10,0	1	15	MODERATE	PLb	
	2.7	1	0,5	10	1	5	LOW	PLa	
	2.8	1	0,5	10	1	5	LOW	PLa	
3a	3.1	1	1,5	6,0	1	9	MODERATE	PLb	PLc
	3.2	1,5	2,5	6,0	1	22,5	MODERATE	PLb	
	3.3	1	2,5	15,0	1	37,5	MODERATE	PLb	
	3.4	5	2,5	15,0	1	187,5	SUBSTANTIAL	PLc	
	3.5	1	1,0	6,0	1	6	MODERATE	PLb	
3b	3.6	2	2,5	6	1	30	MODERATE	PLb	PLb
	3.7	2	2,5	6	1	30	MODERATE	PLb	
	3.8	2	4	6	1	48	MODERATE	PLb	
	3.9	1	1	6	1	6	MODERATE	PLb	
3c	3.10	1,5	1,5	6	1	13,5	MODERATE	PLb	PLc
	3.11	2	2,5	10	1	50	MODERATE	PLb	
	3.12	2	2,5	10	1	50	MODERATE	PLb	
	3.13	8	2,5	10	1	200	SUBSTANTIAL	PLc	

4a	4.1	1,5	2,5	10	1	37,5	MODERATE	PLb	PLb
	4.2	1	2,5	10	1	25	MODERATE	PLb	
	4.3	2	2,5	10	1	50	MODERATE	PLb	
4b	4.4	1,5	4	4	1	24	MODERATE	PLb	PLb
	4.5	1,5	1,0	10,0	1	15	MODERATE	PLb	
	4.6	2	2,5	4	1	20	MODERATE	PLb	
	4.7	1,5	1	10	1	15	MODERATE	PLb	
	4.8	1,5	2,5	10	1	37,5	MODERATE	PLb	
	4.9	1,5	2,5	10	1	37,5	MODERATE	PLb	
4c	4.10	1,5	4	2	1	12	MODERATE	PLb	PLb
	4.11	1,5	2,5	2	1	7,5	MODERATE	PLb	
	4.12	2	1,5	4	1	12	MODERATE	PLb	
	4.13	2	1,5	4	1	12	MODERATE	PLb	
4d	4.14	2	2,5	10	1	50	MODERATE	PLb	PLb
	4.15	1,5	2,5	10	1	37,5	MODERATE	PLb	
	4.16	2	2,5	10	1	50	MODERATE	PLb	
6a	6.1	2	2,5	6	1	30	MODERATE	PLb	PLc
	6.2	1,5	2,5	10	1	37,5	MODERATE	PLb	
	6.3	1,5	2,5	10	1	37,5	MODERATE	PLb	
	6.4	1	2,5	6	1	15	MODERATE	PLb	
	6.5	1	2,5	6	1	15	MODERATE	PLb	
	6.6	1	2,5	6	1	15	MODERATE	PLb	
	6.7	2	4	6	1	48	MODERATE	PLb	
	6.8	1,5	4	10	1	60	SUBSTANTIAL	PLc	
	6.9	1,5	4	10	1	60	SUBSTANTIAL	PLc	
	6.10	1,5	4	2	1	12	MODERATE	PLb	
	6.11	1,5	4	10	1	60	SUBSTANTIAL	PLc	
	6.12	1,5	1	10	1	15	MODERATE	PLb	
	6.13	1	1	10	1	10	MODERATE	PLb	
	6.14	1	1	10	1	10	MODERATE	PLb	
	6.15	1,5	1	10	1	15	MODERATE	PLb	
6.16	1	1	2	1	2	LOW	PLa		
6.17	1,5	1	10	1	15	MODERATE	PLb		
6.18	1	1	10	1	10	MODERATE	PLb		

7	7.1	1	2,5	10	1	25	MODERATE	PLb	PL b
	7.2	1	2,5	15	1	37,5	MODERATE	PLb	
	7.3	1	1,5	10	1	15	MODERATE	PLb	
	7.4	2	4	2	1	16	MODERATE	PLb	
	7.5	1	2,5	10	1	25	MODERATE	PLb	
	7.6	2	2,5	2	1	10	MODERATE	PLb	
	7.7	1	2,5	15	1	37,5	MODERATE	PLb	
	7.8	1	2,5	6	1	15	MODERATE	PLb	
	7.9	1	1	10	1	10	MODERATE	PLb	
	7.10	1	1	6	1	6	MODERATE	PLb	
8	8.1	1,5	2,5	6	1	22,5	MODERATE	PLb	PL b
	8.2	1,5	2,5	10	1	37,5	MODERATE	PLb	
	8.3	1,5	2,5	6	1	22,5	MODERATE	PLb	
	8.4	1,5	1,5	6	1	13,5	MODERATE	PLb	
	8.5	1,5	1,5	10	1	22,5	MODERATE	PLb	
	8.6	1,5	1,5	6	1	13,5	MODERATE	PLb	
	8.7	1	2,5	10	1	25	MODERATE	PLb	
	8.8	2	2,5	6	1	30	MODERATE	PLb	
	8.9	2	2,5	6	1	30	MODERATE	PLb	
	8.10	1	1	10	1	10	MODERATE	PLb	
	8.11	1,5	1	6	1	9	MODERATE	PLb	
	8.12	1,5	1	6	1	9	MODERATE	PLb	
9	9.1	1,5	2,5	15	1	56,25	SUBSTANTIAL	PLc	PLc
	9.2	1,5	4	15	1	90	SUBSTANTIAL	PLc	
	9.3	1,5	4	15	1	90	SUBSTANTIAL	PLc	
	9.4	2	2,5	15	1	75	SUBSTANTIAL	PLc	
	9.5	1,5	1	15	1	22,5	MODERATE	PLb	
	9.6	1,5	1	15	1	22,5	MODERATE	PLb	
10	10.1	1,5	2,5	6	1	22,5	MODERATE	PLb	PL b
	10.2	1	2,5	15	1	37,5	MODERATE	PLb	

18	18.1	2	1,5	15	2	90	SUBSTANTIAL	PLc	PL c
	18.2	1,5	1,5	15	2	67,5	SUBSTANTIAL	PLc	
	18.3	1	1,5	15	2	45	MODERATE	PLb	
	18.4	1	4	15	2	120	SUBSTANTIAL	PLc	
	18.5	2	4	15	2	240	SUBSTANTIAL	PLc	
	18.6	1,5	4	15	2	180	SUBSTANTIAL	PLc	
	18.7	1	1	15	2	30	MODERATE	PLb	
	18.8	2	1,5	2	2	12	MODERATE	PLb	
	18.9	1	1,5	2	2	6	MODERATE	PLb	
	18.10	2	4	2	2	32	MODERATE	PLb	
	18.11	1	1	2	2	4	LOW	PLa	
	18.12	1	1	2	2	4	LOW	PLa	
	18.13	1,5	4	15	2	180	SUBSTANTIAL	PLc	
	18.14	2	4	15	2	240	SUBSTANTIAL	PLc	
	18.15	2	1,5	15	2	90	SUBSTANTIAL	PLc	
	18.16	2	1,5	15	2	90	SUBSTANTIAL	PLc	
	18.17	1,5	1,5	6	1	13,5	MODERATE	PLb	
	18.18	1	1,5	6	1	9	MODERATE	PLb	
	18.19	1	1,5	6	1	9	MODERATE	PLb	
	18.20	1,5	4	15	1	90	SUBSTANTIAL	PLc	
	18.21	1,5	4	15	1	90	SUBSTANTIAL	PLc	
	18.22	1	1	6	1	6	MODERATE	PLb	
19	19.1	1	2,5	10	1	25	MODERATE	PLb	PLc
	19.2	2	2,5	10	1	50	MODERATE	PLb	
	19.3	1	4	15	2	120	SUBSTANTIAL	PLc	
	19.4	2	4	15	2	240	SUBSTANTIAL	PLc	
	19.5	1	1	10	2	20	MODERATE	PLb	
	19.6	2	1	10	2	40	MODERATE	PLb	
	19.9	2	1,5	10	1	30	MODERATE	PLb	
	19.10	1	2,5	15	1	37,5	MODERATE	PLb	
	19.11	2	2,5	15	1	75	SUBSTANTIAL	PLc	
	19.12	1	1	10	1	10	MODERATE	PLb	
	19.13	1	1	10	1	10	MODERATE	PLb	
	19.15	1	2,5	2	1	5	LOW	PLa	
	19.16	2	2,5	2	1	10	MODERATE	PLb	
	19.17	1	4	2	2	16	MODERATE	PLb	
19.18	2	4	2	2	32	MODERATE	PLb		
19.19	1	1	2	2	4	LOW	PLa		
19.20	2	1	2	2	8	MODERATE	PLb		

20	20.1	1,5	1,5	10	1	22,5	MODERATE	PLb	PLc
	20.2	1	1,5	15	1	22,5	MODERATE	PLb	
	20.3	1	1,5	15	1	22,5	MODERATE	PLb	
	20.4	2	1,5	15	1	45	MODERATE	PLb	
	20.5	1,5	4	10	1	60	SUBSTANTIAL	PLc	
	20.6	1	4	15	1	60	SUBSTANTIAL	PLc	
	20.7	1	4	15	1	60	SUBSTANTIAL	PLc	
	20.8	2	4	10	1	80	SUBSTANTIAL	PLc	
	20.9	1,5	2,5	10	1	37,5	MODERATE	PLb	
	20.10	1	2,5	15	1	37,5	MODERATE	PLb	
	20.11	1	2,5	15	1	37,5	MODERATE	PLb	
	20.12	2	1	10	1	20	MODERATE	PLb	
	20.13	1,5	1	15	1	22,5	MODERATE	PLb	
	20.14	1,5	1	15	1	22,5	MODERATE	PLb	
	20.15	2	1	15	1	30	MODERATE	PLb	
21	21.1	1,5	1	10	1	15	MODERATE	PLb	PLb
	21.2	2	1	6	1	12	MODERATE	PLb	
	21.3	1,5	1	10	1	15	MODERATE	PLb	
	21.4	1,5	2,5	6	1	22,5	MODERATE	PLb	
	21.5	2	2,5	6	1	30	MODERATE	PLb	
	21.6	2	2,5	10	1	50	MODERATE	PLb	
	21.7	2	1	10	1	20	MODERATE	PLb	
	21.8	2	1	10	1	20	MODERATE	PLb	
	21.9	2	1	10	1	20	MODERATE	PLb	
22a	22a.1	2	2,5	10	1	50	MODERATE	PLb	PLc
	22a.2	5	2,5	15	1	187,5	SUBSTANTIAL	PLc	
	22a.3	8	1	10	1	80	SUBSTANTIAL	PLc	
	22a.4	8	1	15	1	120	SUBSTANTIAL	PLc	
	22a.5	2	1	10	1	20	MODERATE	PLb	
	22a.6	2	1	15	1	30	MODERATE	PLb	
	22a.7	2	2,5	10	1	50	MODERATE	PLb	
	22a.8	5	2,5	15	1	187,5	SUBSTANTIAL	PLc	
	22a.9	8	1	10	1	80	SUBSTANTIAL	PLc	
	22a.10	8	1	15	1	120	SUBSTANTIAL	PLc	

22b	22b.1	1,5	1	10	1	15	MODERATE	PLb	PLc
	22b.2	2	1	10	1	20	MODERATE	PLb	
	22b.3	1,5	1	10	1	15	MODERATE	PLb	
	22b.4	2	1	10	1	20	MODERATE	PLb	
	22b.5	5	1	10	1	50	MODERATE	PLb	
	22b.6	5	1,5	10	1	75	SUBSTANTIAL	PLc	
	22b.7	1,5	2,5	10	1	37,5	MODERATE	PLb	
	22b.8	1,5	2,5	10	1	37,5	MODERATE	PLb	
	22b.9	1,5	2,5	10	1	37,5	MODERATE	PLb	
	22b.10	1,5	2,5	10	1	37,5	MODERATE	PLb	
	22b.11	5	2,5	10	1	125	SUBSTANTIAL	PLc	
	22b.12	5	2,5	15	1	187,5	SUBSTANTIAL	PLc	
	22b.13	1,5	1	6	1	9	MODERATE	PLb	
	22b.14	1,5	1	6	1	9	MODERATE	PLb	
	22b.15	1,5	1	10	1	15	MODERATE	PLb	
	22b.16	1,5	1	10	1	15	MODERATE	PLb	
	22b.17	5	1	10	1	50	MODERATE	PLb	
	22b.18	5	1	10	1	50	MODERATE	PLb	
22c	22c.1	1,5	1	10	1	15	MODERATE	PLb	PLc
	22c.2	2	1	15	1	30	MODERATE	PLb	
	22c.3	2	2,5	10	1	50	MODERATE	PLb	
	22c.4	2	2,5	15	1	75	SUBSTANTIAL	PLc	
	22c.5	2	1	10	1	20	MODERATE	PLb	
	22c.6	2	1	15	1	30	MODERATE	PLb	
22d	22c.1	1,5	1	10	1	15	MODERATE	PLb	PLc
	22c.2	2	1	15	1	30	MODERATE	PLb	
	22c.3	2	2,5	10	1	50	MODERATE	PLb	
	22c.4	2	2,5	15	1	75	SUBSTANTIAL	PLc	
	22c.5	2	1	10	1	20	MODERATE	PLb	
	22c.6	2	1	15	1	30	MODERATE	PLb	

## Bibliography

- [1] EN 15000:2008 *Safety of industrial trucks — Self-propelled variable reach trucks — Specification, performance and test requirements for longitudinal load moment indicators and longitudinal load moment limiters.*
- [2] ISO/DTR 18670:2012 *Safety of machinery — How ISO 12100 relates to ISO 13849-1*

Fine, W.T. 1971. Mathematical Evaluation for controlling Hazards, Journal of Safety Research

Kinney, G and Wiruth A. 1976, Practical Risk Analysis for Safety management

Proctor Risk Assessment Calculator, [www.machinerysafety.co.uk](http://www.machinerysafety.co.uk)

[http://ec.europa.eu/consumers/safety/committees/wks\\_pres2\\_11122007.pdf](http://ec.europa.eu/consumers/safety/committees/wks_pres2_11122007.pdf)

The above link is useful as it gives the EU reason behind the RAPEX system using the RAG method for risk assessing on consumer products and this avoids exposure as it assumes the exposure is 100% and always present which is not a correct assumption for mobile machinery.





# British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

## About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

## Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at [bsigroup.com/standards](http://bsigroup.com/standards) or contacting our Customer Services team or Knowledge Centre.

## Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at [bsigroup.com/shop](http://bsigroup.com/shop), where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

## Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to [bsigroup.com/subscriptions](http://bsigroup.com/subscriptions).

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

**PLUS** is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit [bsigroup.com/shop](http://bsigroup.com/shop).

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email [bsmusales@bsigroup.com](mailto:bsmusales@bsigroup.com).

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

## Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

## Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

## Useful Contacts:

### Customer Services

**Tel:** +44 845 086 9001

**Email (orders):** [orders@bsigroup.com](mailto:orders@bsigroup.com)

**Email (enquiries):** [cservices@bsigroup.com](mailto:cservices@bsigroup.com)

### Subscriptions

**Tel:** +44 845 086 9001

**Email:** [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com)

### Knowledge Centre

**Tel:** +44 20 8996 7004

**Email:** [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)

### Copyright & Licensing

**Tel:** +44 20 8996 7070

**Email:** [copyright@bsigroup.com](mailto:copyright@bsigroup.com)



...making excellence a habit.™