INTERNATIONAL STANDARD

ISO 11662-1

First edition
1995-06-01

Mobile cranes — Experimental determination of crane performance —

Part 1:
Tipping loads and radii

Grues mobiles — Détermination expérimentale des performances des grues —

Partie 1: Charges de basculement et portées

Reference number
ISO 11662-1:1995(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11662-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 6, *Mobile cranes*.

ISO 11662 consists of the following parts, under the general title *Mobile cranes — Experimental determination of crane performance* :

— *Part 1: Tipping loads and radii*

— *Part 2: Structural characteristics*

— *Part 3: Dynamic characteristics*

Annex A of this part of ISO 11662 is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

ISO 11662 specifies test methods to be used to verify the design of a crane relative to its load rating chart. These tests will normally be one-time tests carried out on the prototype of a new model. Based on the test results, the load chart of the crane shall be modified where necessary to comply with the requirements of the International Standard.

Mobile cranes — Experimental determination of crane performance —

Part 1:
Tipping loads and radii

1 Scope

This part of ISO 11662 specifies a test method to determine the maximum capacity of a mobile crane to counterbalance loads applied on its hook block.

The test is applicable for cranes whose capacity to support loads is based on its static resistance to overturning. The test shall not be used on cranes whose capacity is based on structural strength or on limitations due to available load hoist, jib hoist or jib telescope capability.

This part of ISO 11662 applies to all mobile cranes as defined in ISO 4306-2.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 11662. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11662 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4306-2:1994, *Lifting appliances — Vocabulary — Part 2: Mobile cranes.*

3 Definitions

For the purpose of this part of ISO 11662, the following definitions apply.

3.1 balance condition: Condition of crane loading in which the load moment acting to overturn the crane is equal to the maximum moment of the crane available to resist overturning.

3.2 axis of rotation: Vertical line through the axis around which the crane superstructure rotates before load is applied to the crane hook.

3.3 load: Force acting to unbalance a crane, resulting from the gravitational force created by the hook block itself and the charges suspended from it.

3.4 radius of load: Horizontal distance between the point from which the radius is measured projected onto the supporting surface before loading, and the centre of the vertical hoist line or tackle after loading.

4 Principle

The load is applied by freely suspending from the crane hook block a weight of predetermined magnitude and either lengthening the radius until crane stability is overcome, or adding incremental weights using a fixed radius until crane stability is overcome.

The tester should ensure that tests are made in the least stable direction for each rating under test.

5 Apparatus

5.1 Supporting surface, of concrete or other firm material, sufficiently large to provide for unobstructed testing.

5.2 Means for measuring the load radius to an accuracy of ±1 % or ±0,15 m, whichever is smaller.

5.3 Tyre pressure gauge, having an accuracy of ±3 % of the measured pressure.

5.4 Means for measuring the horizontal distance from the axis of rotation to the centre of gravity of the load.

5.5 Means for measuring the mass of test weights, hook block, slings and ancillary equipment (excluding the hoist rope), to an accuracy of ±1 % of the measured load.

5.6 Test weights, hook blocks, slings and ancillary equipment (excluding the hoist rope) of mass known to within ±1 %.

6 Test conditions

6.1 For the purpose of testing, the crane shall be equipped with working equipment suitable for operation with the rated load.

6.2 When testing cranes on pneumatic tyres or crawler equipment, the appliance shall be placed on a firm level surface (≤ 1 % gradient).

6.3 When testing pneumatic-tyred equipment while operating on tyres, the tyres shall be inflated to within ±3 % of the pressure stipulated by the manufacturer, and all wheels shall be in the ahead position.

Conditions for tyre support shall comply with manufacturers requirements.

6.4 For conducting tests of cranes with outriggers in the "on outriggers" condition, the crane shall be level (≤ 1% gradient).

6.4.1 When outriggers are used in the course of testing pneumatic-tyred cranes, the crane shall be raised by the outriggers so as to provide clearance between the ground and all the wheels or to relieve all wheels of the weight of the crane unless the suspension design is such that the tyres stay on the ground when outriggers are set.

6.4.2 When outriggers are used in the course of testing crawler cranes, the crane shall be installed so as to ensure firm bearing of the outriggers on the supporting surface.

6.5 The fuel tank shall be no more than one-third full. Coolant, lubricating oil and hydraulic fluids shall be at the operating levels specified by the manufacturer.

6.6 Wind direction should be such that it does not increase the stability of the crane.

7 Test procedure

7.1 Test preparation

7.1.1 Service and adjust the crane as applicable according to the manufacturer's recommendation to assure specified conditions of

a) lubrication;

b) fuel supply;

c) tyre inflation;

d) coolant supply;

e) track tension;

f) bolts, pins, cable fittings and other load-bearing components;

g) clutches, brakes and other power transmission components;

h) boom length and rigging;

j) crane level (≤ 1 % gradient).

7.1.2 A competent operator shall operate the crane. In the absence of specific recommendations, a new machine should be operated for at least 4 h to ensure proper function of the machine. At the conclusion of this initial operation, service and adjust the machine to the specified conditions.

7.1.3 Locate the crane on the test course in position for loading and actuate the travel brakes.

7.1.4 Set outriggers, if used, and jack the crane to a position in which the tyres or tracks within the boundary of the outriggers are unloaded.

7.1.5 Vertically project the superstructure axis-of-rotation onto the surface of the test course and mark its location.

7.2 Test measurements

7.2.1 Prepare test load, including test weights, hook block, slings and any other ancillary equipment, such as load basket, to make up the specified load mass to within ±1 %. Record this value.

7.2.2 With the crane superstructure in its least stable configuration for the specified position, hoist the load free from the test surface at a radius at which the crane is stable; then boom down a small amount to increase the radius. Keep the load within 0,1 m of the test surface at all times to prevent excessive tipping. If the crane will support the load at the adjusted radius without tipping, measure and record the new radius. Repeat the procedure until the balance point is reached. When the balance point is reached, record the mass of the load and radius of the load.

NOTE 1 The final adjustment of the balance point may be made by adding small increments of mass rather than increasing the radius.

7.2.3 Alternatively, measure the radius of load and add small increments of mass to the load until the load overcomes the stability of the crane. The radius of load and load mass last employed, before the stability of the crane was overcome, shall be recorded as the balance point condition.

8 Plotting of capacity curve

Where it is desired to determine the balance point capacities of a crane throughout a range of loads or radii, follow procedures as outlined in 7.2, making sure that the load and radius are determined for each extreme of the chosen range and at a sufficient number of intermediate points to permit plotting a curve. Plot a curve showing the maximum capacity of the crane with the load, in kilograms, as ordinate and radius, in metres, as abscissa. Use a representative number of boom lengths for a given capacity chart.

9 Test report

Record a complete description of the crane, positions for the test, data for the tipping load and the radius of load on test data sheets. See table 1 and figures 1 and 2 for examples of test data sheets.

Table 1 — Data sheet for mobile crane description and balance points

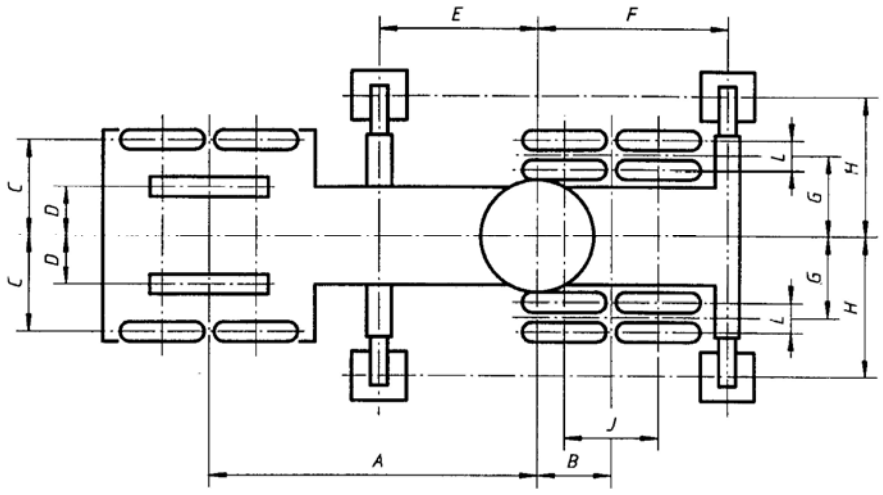
Manufacturer.....	Model.....	Serial No. .....
Condition: New ☐	Used ☐	Hours of previous use .....
Mounting: Type		Size.....
Tyres: Size.....	Radial ..... Ply	Pressure (kPa) .....
Boom: Type.....		Length (m) .....
Boom jib: Type	Length (m).....	Angle to the boom/ground[1] .....
Engine: Manufacturer.....	Model.....	Serial No. .....
Counterweight: Type.....		Mass (kg).....
Test method: Suspended weights ☐		Anchor ☐

Position of superstructure	Balance points			
	Without outriggers		With outriggers	
	Load (kg)	Radius (m)	Load (kg)	Radius (m)

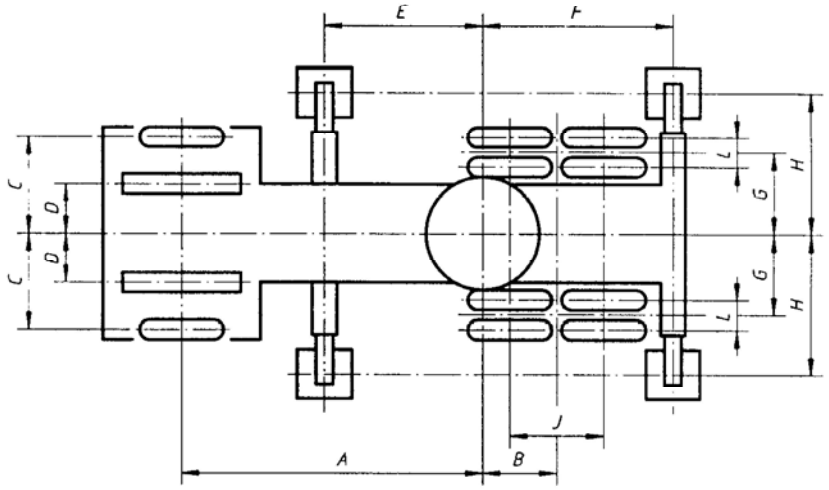
Remarks: .....

Operator: ..... Date of test: .....

1) When fly jib is fixed, the angle is to the boom; when fly jib is luffing, the angle is to the ground.



8 x 4 truck



6 x 4 truck

Dimensions of undercarriage chassis for wheel-mounted cranes

A _____	B _____	C _____
D _____	E _____	F _____
G _____	H _____	J _____
L _____		

Figure 1 — Data sheet for physical dimensions of undercarriage chassis for wheel-mounted cranes

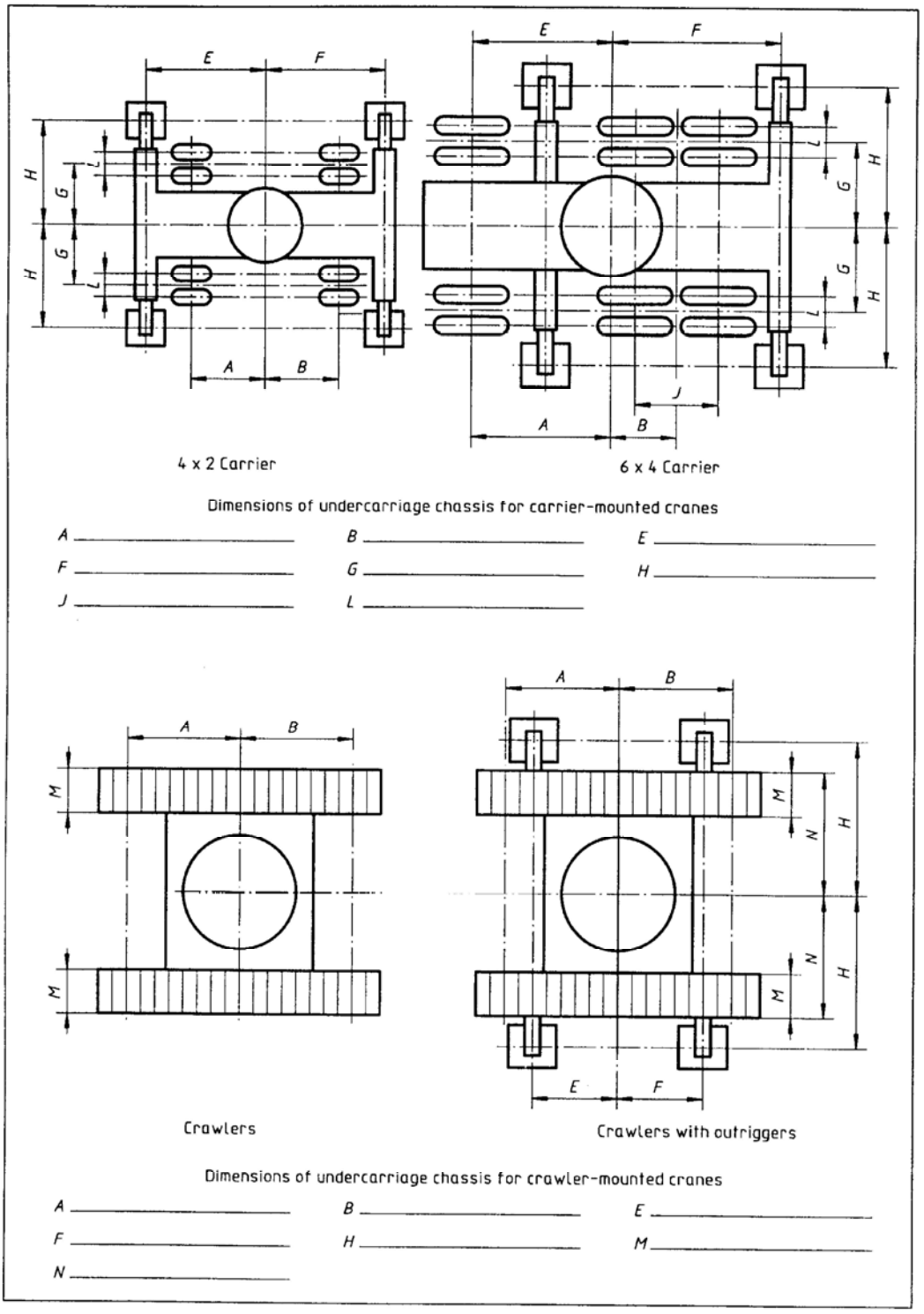


Figure 2 — Data sheet for physical dimensions of undercarriage chassis for carrier-mounted and crawler-mounted cranes

Annex A
(informative)

Bibliography

[1] ISO 4305:1991, *Mobile cranes — Determination of stability.*

ICS 53.020.20

Descriptors: handling equipment, lifting equipment, mobile equipment, cranes (hoist), tests, performance tests, determination, load capacity, maximum value.

Price based on 7 pages