

ASME NOG-1–2015
(Revision of ASME NOG-1–2010)

Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

ASME NOG-1–2015
(Revision of ASME NOG-1–2010)

Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: February 20, 2015

The next edition of this Standard is scheduled for publication in 2020.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at <http://cstools.asme.org/> as they are issued.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at <http://cstools.asme.org/>. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting “Errata” in the “Publication Information” section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assumes any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2015 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

Foreword	vi
Committee Roster	vii
Preparation of Technical Inquiries to the Committee on Cranes for Nuclear Facilities	viii
Summary of Changes	ix
Section 1000 Introduction	1
1100 General	1
Section 2000 Quality Assurance	11
2100 Requirements	11
Section 3000 Coatings and Finishes	12
3100 Coating Service Levels	12
3200 Specific Requirements for Coating Service Levels	12
Section 4000 Requirements for Structural Components	14
4100 General	14
4200 Materials and Connections	24
4300 Design Criteria	30
4400 Component Design	35
Section 5000 Mechanical	39
5100 General	39
5200 Materials	42
5300 Design and Performance Criteria	42
5400 Component Design	44
5500 Miscellaneous	81
Section 6000 Electrical Components	83
6100 General	83
6200 Wiring Materials and Methods (Types I, II, and III Cranes)	84
6300 Performance Specifications (Types I, II, and III Cranes)	85
6400 Component Selection (Types I, II, and III Cranes)	86
6500 Electrical Equipment Testing Requirements (Types I, II, and III Cranes)	100
Section 7000 Inspection and Testing	101
7100 Tests and Acceptance Criteria	101
7200 Manufacturing	102
7300 Receipt and Storage Requirements for Storage Facility and/or Site	107
7400 Site	108
7500 Qualification for Permanent Plant Service	111
7600 Documentation	113
Section 8000 Packaging, Shipping, Receiving, Storage, and Handling	114
8100 General	114
Section 9000 Planned Engineered Lifts	115
9100 General	115
9200 Capacity Limitations	115
9300 Lift Frequency Limitations	115
9400 Inspection Frequency	115
9500 Planned Engineered Lifts for Bridge or Gantry Only	115
9600 Planned Engineered Lifts for Hoist and Trolley Only	116

9700	Required Interlocks or Stops	116
9800	Load Testing Requirements	116
9900	Crane Wheel Loads	116

Figures

4153.3-1	Typical Four-Wheel Trolley Model for Seismic Analysis	18
4153.3-2	Typical Four-Wheel Overhead Crane Model for Seismic Analysis	18
4153.3-3	Typical Four-Wheel Gantry Crane Model for Seismic Analysis	19
4153.3-4	Typical Four-Wheel Semi-Gantry Crane Model for Seismic Analysis	19
4160-1	Runway Rail Alignment Tolerance	25
5411.5-1	Drum Shell Design	46
5413.1-1	Allowable Yield Stress, s_{ay}	48
5416.1-1	Typical Hoist Machinery Arrangement With Emergency Brake	52
5416.1-2	Typical Hoist Machinery Arrangement With Redundant Gear Reducers and Brakes	53
5416.1-3	Typical Redundant-Hoist Machinery Arrangement	54
5420-1	Single-Failure-Proof Reeving Example	55
5420-2	Single and Double Reeving	56
5426.1-1	Drum Fleet Angle	57
5426.1-2	Sheave Fleet Angle	58
5427.1-1	Proportions for 24:1 Sheave-to-Rope Ratio	59
5427.1-2	Proportions for 30:1 Sheave-to-Rope Ratio	60
5430-1	Arrangement of Crane Trolley Drives	61
5440-1	Arrangement of Crane Bridge Drives	63
5440-2	Arrangement of Polar Cranes	64
5452.4-1	Minimum Flange Widths and Heights	68
5459.3-1	Power or Control Circuit Limit Switch With Geared Upper Limit Switch	73
5459.3-2	Power or Control Circuit Limit Switch	73
5474-1	Allowable Bending Stress	75
5474-2	Allowable Tension or Compression Stress	76
5474-3	Allowable Shear Stress	77
5477-1	Typical Hook Cross-Section	78
5477-2	Fish Hook Configuration	78
5477-3	Equivalent Section	79
5477-4	Sister Hook Without a Pinhole	80
5477-5	Sister Hook With a Pinhole	80
6472.2-1	K_a Factors for AC and Adjustable Voltage DC Motors (Without Field Weakening)	95
6472.2-2	Typical Polar Crane	96
6473-1	Typical Characteristic Curves for AC Wound Rotor Motors (Examples for 0.75 per Unit Horsepower and 20% Total Resistance)	99
7521.2-1	Inspection for Wheel Wear	112

Tables

4153.6-1	Boundary Conditions: Trolley Wheels to Trolley Rails	21
4153.6-2	Boundary Conditions: Bridge Wheels to Crane Runway Rails	21
4211-1	Acceptable Materials and Reference Properties for Structural Components	26
4212-1	Required C_v Energy Values for Structural Materials (Except Bolting)	27
4221-1	Acceptable Fastener Materials for Structural Connections for Types I and II Cranes	27
4221-2	Fastener Materials That May Be Galvanized	28
4222-1	C_v Energy Values for Fastener Materials	28
4232-1	Test Temperature for Filler Metal — Charpy V-Notch Impact Tests With 20 ft-lb Average Energy	28
4251.5-1	Exemptions to Mandatory Postweld Heat Treatment	29
4311-1	Maximum Allowable Stresses in Structural Steel Members	31

4315-1	Allowable Stresses for Bolts Other Than ASTM A325 or ASTM A490	31
4332.1-1	Value of the Buckling Coefficients, K_{σ} and K_{τ} , for Plates Supported at Their Four Edges	34
5331.1-1	Rated Load Recommended Hoist Speeds	43
5332.1-1	Rated Load Recommended Trolley Speeds	44
5333.1-1	Rated Load Recommended Bridge Speeds	44
5413.1-1	Gearing Allowable Stresses	49
5413.1-2	Load Distribution R Factors	49
5415.1-1	Load Combinations — Hoist Drive Shafting	51
5452.3-1	Allowable Wheel Loads for Rim-Toughened Crane Wheels, P , lb, for Speed Factor = 1	67
5452.3-2	Speed Factor for Determining Allowable Maximum Wheel Load	67
5452.4-1	Guide for Wheel Flange Width and Height	69
5453.1-1	Load Combinations — Bridge and Trolley Axles	69
5454.1-1	Deflections	69
6472.2-1	Overall Friction Factors (Antifriction Bearings)	93
6472.2-2	Suggested Acceleration Rates for AC or AV Travel Drives	94
6472.2-3	Suggested Maximum Acceleration Rates	94
6472.3-1	Duty Classes	97
7210-1	Required Inspections or Tests — Type I	103
7210-2	Required Inspections or Tests — Type II	106
8100-1	Applicable Requirements of ASME NQA-1, Part II, Subpart 2.2, With Modifications of 8000	114
Mandatory Appendices		
I	Additional Requirements	117
II	Criteria Required for Structural Qualification of an Existing Crane Bridge for Use With an ASME NOG-1 Type I Hoist and Trolley	120
Nonmandatory Appendices		
A	Recommended Practices	125
B	Commentary	130
C	NUREG-0554/ASME NOG-1 Conformance Matrix	136