ASME NML-1–2019

Rules for the Movement of Loads Using Overhead Handling Equipment in Nuclear Facilities

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

ASME NML-1, Rules for the Movement of Loads Using Overhead Handling Equipment in Nuclear Facilities, was developed by the ASME Committee on Cranes for Nuclear Facilities (CNF) to define the requirements and guidelines for a safe, effective load-handling program at commercial nuclear facilities using overhead handling equipment.

In July 1980, the Nuclear Regulatory Commission (NRC) issued NUREG-0612, Control of Heavy Loads at Nuclear Power Plants. Since then, this report has been used to define and control load-handling programs at commercial nuclear power plants.

In 1981, the NRC issued Generic Letter 81-07 asking utilities with nuclear power plants to demonstrate that they were in compliance with the requirements of NUREG-0612, Section 5.1. The nuclear power plants were asked to respond in two phases. For Phase I, nuclear power plants were asked to demonstrate their compliance to the seven guidelines in Section 5.1.1. For Phase II, nuclear power plants were asked to demonstrate their compliance with Sections 5.1.2 through 5.1.6. The Phase II demonstration of compliance required a description of all overhead handling systems used at a nuclear facility; a comparison of the facility's overhead cranes to those described in NUREG-0554, Single-Failure-Proof Cranes for Nuclear Power Plants; and identification of all hazards within the facility and potential methods for eliminating those identified hazards. Generic Letter 85-11 cancelled Phase II requirements (except for any licensing commitments made by a facility) for most nuclear power plants.

One of the seven guidelines of NUREG-0612, Section 5.1, states that facilities shall have administrative controls in place to control the movement of heavy loads. The NRC defines a heavy load as "any load, carried in a given area after a plant becomes operational, that weighs more than the combined weight of a single spent fuel assembly and its associated handling tool for the specific plant in question." Thus, facilities developed procedures to control the movement of loads in excess of the heavy-load limit. The procedures defined crane operator qualifications, specified the locations of safe load paths, and identified special lifting devices.

NUREG-0612, Section 5.1, invokes ANSI N14.6-1978 for guidelines on the design, construction, fabrication, and testing of special lifting devices, and ANSI B30.9-1971 for guidelines on slings used for the movement of heavy loads. ANSI N14.6-1978 was superseded by revised editions in 1986 and 1993 and has since been withdrawn. Since 1971, ASME has issued numerous revisions to ANSI B30.9, and it redesignated the standard as ASME B30.9 in 1990.

Given the age of NUREG-0612, the ASME CNF Committee recognized the need for a new standard to address the control of heavy loads in nuclear power plants. This Standard has been written to maintain consistency with principles found in NUREG-0612. Thus, lifting evolutions with potential radiological consequences greater than a fuel-handling accident are still considered critical, and the seven guidelines have been incorporated into this Standard. However, ASME NML-1 invokes newer standards for requirements specific to overhead handling equipment, below-the-hook lifting devices, slings, and rigging hardware.

As its title indicates, this Standard includes requirements for the movement of all loads using overhead handling equipment within a nuclear facility. It applies a graded approach to the level of controls required for the variety of lifts performed in a nuclear facility, separating lifts into three classifications: standard, special, and critical.

The risk of performing a lift determines the classification of the lift. The risk is quantified based on an evaluation of the factors that may increase the probability of a malfunction or load-handling event and an evaluation of the potential consequences of such an occurrence.

The lift classifications represent increasing levels of risk: a standard lift has the lowest risk, a special lift has a moderate risk, and a critical lift has the highest risk. Special lifts may be appropriate for managing material-handling activities having moderate levels of risk. Within the critical lift classification, this Standard includes a distinct classification, nuclear safety critical lifts, for lifts similar to those characterized in NUREG-0612. Because of the safety-related risks inherent to nuclear safety critical lifts, these lifts require more stringent safety measures than do the other lift classifications.

This Standard also provides requirements for crane design, inspection, and testing and for personnel involved in lifting operations. It also includes three Nonmandatory Appendices. Nonmandatory Appendix A provides a matrix showing conformance of ASME NML-1 to NUREG-0612. Nonmandatory Appendix B provides guidance on adopting ASME NML-1 to operating nuclear power plants or other nuclear facilities licensed under the Code of Federal Regulations, Title 10, Part 50. And Nonmandatory Appendix C provides examples of lift classifications based on the risk associated with the evolution. The lift planner may use these examples as guidance to ensure the correct classification of the lift and the appropriate level of rigor and oversight.

This Standard or portions thereof may be applied to load handling, operations, and maintenance at facilities other than nuclear where enhanced safety may be required.

Following approval by the ASME CNF Committee and ASME, and after public review, ASME NML-1 was approved by the American National Standards Institute on June 5, 2019.

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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, CNF Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Interpretations. Upon request, the CNF Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the CNF Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may mail the request to the Secretary of the CNF Standards Committee at the above address. The request for an interpretation should be clear and unambiguous. It is further recommended that the Inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry in one or two words.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. Please provide a condensed and precise question, composed in such a way that a "yes" or "no" reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of "Yes" or "No," with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. The Inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The CNF Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the CNF Standards Committee.

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Section 1
Introduction

1-1 GENERAL

Movement of loads covered by this Standard shall be in accordance with the Standard's requirements but not necessarily with its recommendations. The word "shall" is used to denote a requirement, the word "should" is used to denote a recommendation, and the word "may" is used to denote permission, which is neither a requirement nor a recommendation.

1-2 SCOPE

This Standard specifies requirements for the movement of loads using overhead handling systems at commercial nuclear facilities.

(a) For the purposes of this Standard, overhead handling systems are limited to the following:

(1) those types covered by the following standards:

(-a) ASME B30.1, Chapter 1-6, Telescopic Hydraulic Gantry Systems; and Chapter 1-7, Strand Jack Systems

(-b) ASME B30.2

(-c) ASME B30.5

(-d) ASME B30.16

(-e) ASME B30.17

(-f) ASME B30.21

(-g) ASME NOG-1

(-h) ASME NUM-1

(2) those defined as engineered temporary lift assemblies per subsection 1-5

(3) those qualified as special designed equipment per ASME HRT-1

(b) This Standard does not cover the individual movement of irradiated fuel assemblies that are bounded by a facility accident analysis.

(c) Lifts licensed under 10 C.F.R. 72 are within the scope of this Standard.

1-3 APPLICABILITY

This Standard applies to all lifting and handling operations at nuclear facilities, including the training and certification of personnel, and the maintenance, inspection, testing, and rework and modification of overhead handling systems and other lifting devices.

The application of this Standard shall begin at the point of initial fuel load at the affected unit under construction.

1-4 RESPONSIBILITY

Compliance with this Standard is the responsibility of the owner.

1-5 DEFINITIONS

cascading failures: a process in a system of interconnected parts in which the failure of one or a few parts can trigger the failure of other parts and so on.

design rated torque: the torque required to hold the design rated load of the hoist at the point of brake application.

double-rigging arrangement: a system in which two independent sets of load-carrying elements, each capable of carrying the load, are used to connect the load to the overhead handling equipment.

emergency response plan: a set of actions necessary to mitigate the consequences of the worst possible outcomes of a load-handling accident.

engineered temporary lift assembly (ETLA): specially designed lifting equipment that is not general purpose but has a special temporary intended purpose. These assemblies are not standard design items and are not available from a commercial source, and there is no generally accepted consensus standard applicable to the equipment. Examples of ETLAs include special gin poles and derricks; special crane supports such as runways or overhead gantry columns and frames; and special load-handling equipment such as up-end and down-end devices and jacking towers (unless used with the guidance of the applicable volume of ASME B30). ETLAs are required for lifts that cannot be accomplished with standard lifting devices.

essential safety function (ESF): a function performed by a plant system, structure, or component that is necessary to remove decay heat from irradiated fuel, provide shielding, contain radioactive material, or control nuclear reactivity. For the purposes of this Standard, ESFs are defined as follows:

(a) maintaining adequate decay heat removal.

(b) maintaining reactor coolant system and spent fuel pool inventory necessary for adequate shielding, removal of decay heat, and containment of radioactive material. This may be accomplished by preventing leakage from the reactor vessel (during refueling) and spent fuel pool in excess of safety-related makeup capability.