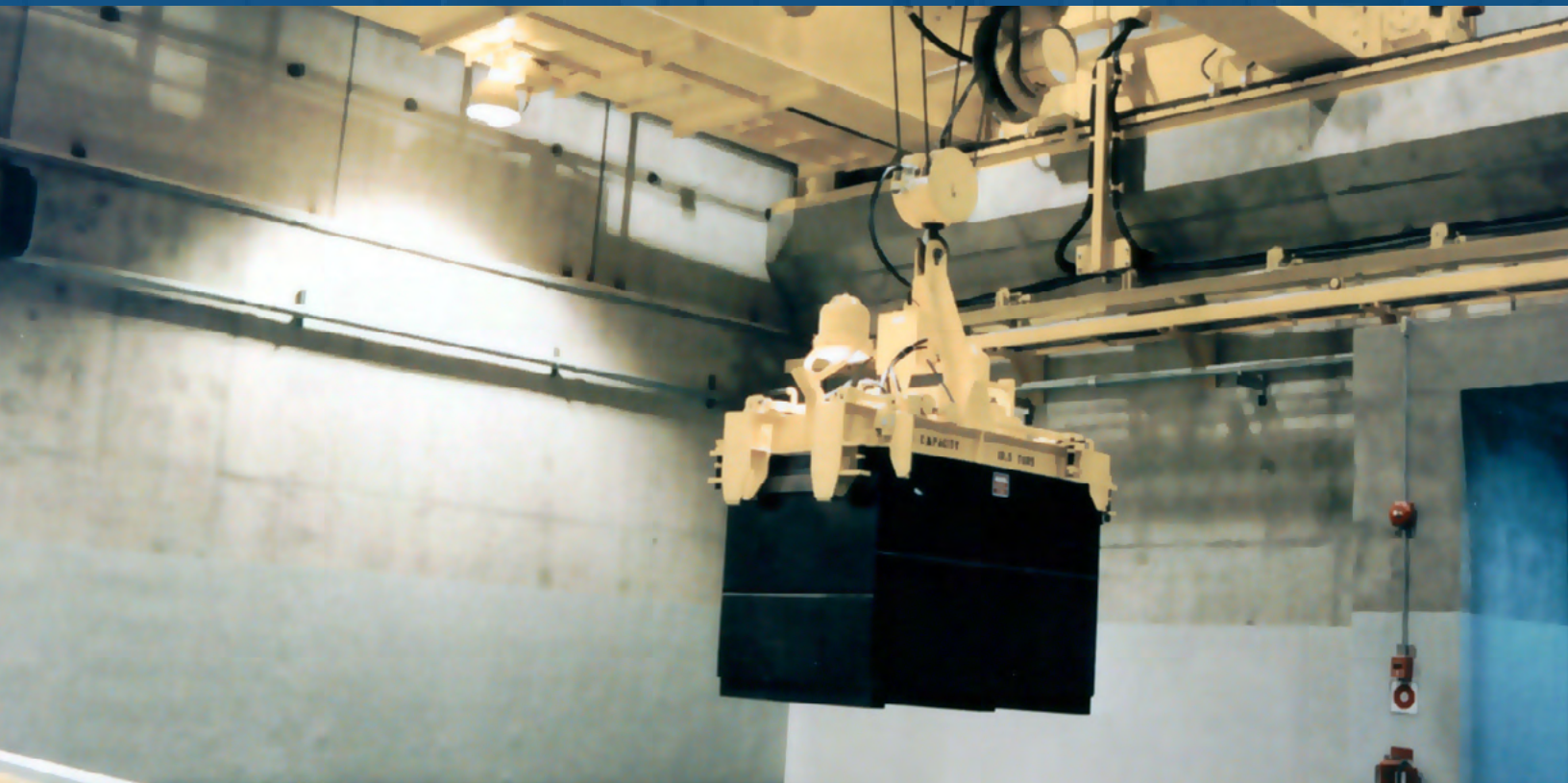

The Below-the-Hook Lifting Playbook





Below-the-hook devices represent a critical stress point in any lift, as they provide the point of connection between the crane and its payload. The American Society of Mechanical Engineers (ASME) offers guidance for design, marking, inspection testing, and other factors in order to maintain a standard level of quality in these devices.

These below-the-hook devices can take a variety of forms, including:

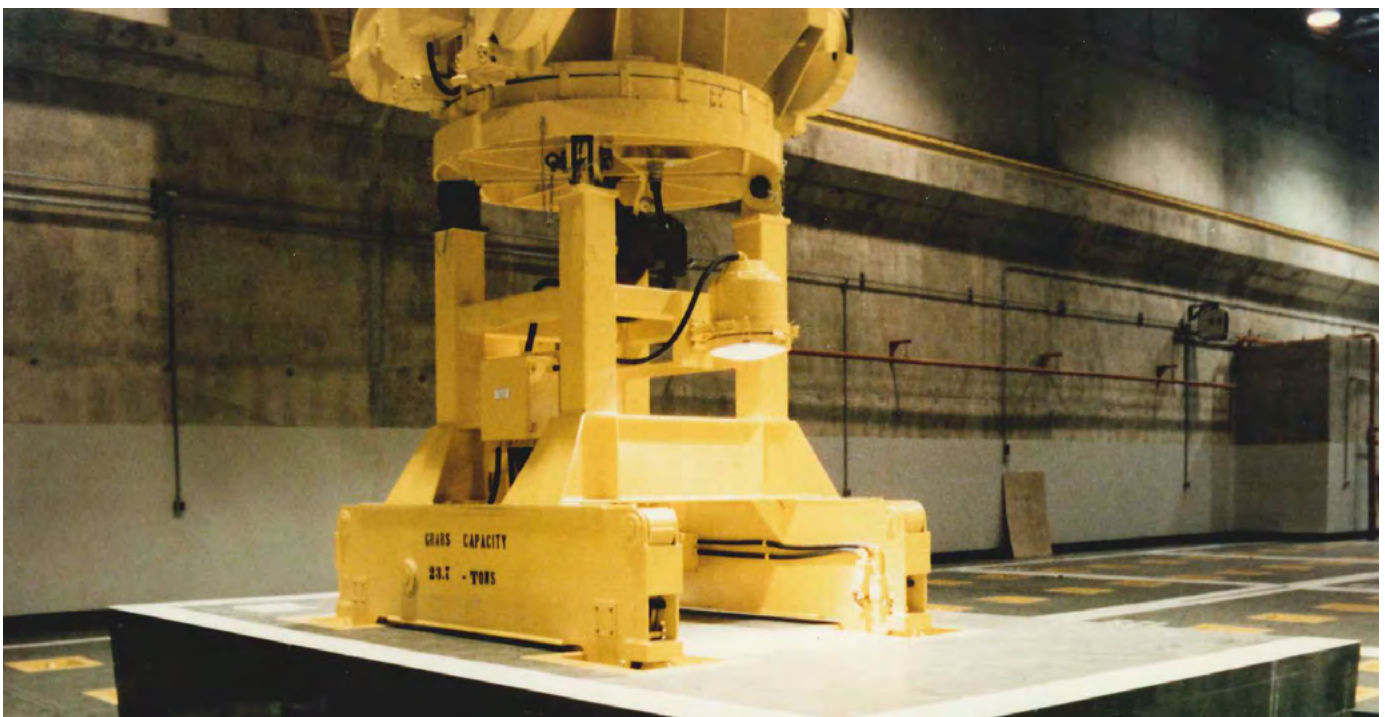
- Magnets
- Vacuum lifters
- Lifting Beams
- Grapples

Below-the-Hook Devices

The ASME defines below-the-hook lifting equipment as devices “used for attaching a load to a hoist. The device may contain components such as slings, hooks, and rigging hardware.” In general, these devices are responsible for attaching to or grabbing a load and maintaining a secure connection to the crane as movement is initiated, enabling safe and secure delivery of the payload to the required final location.

Given the many kinds of items transported by crane, customization is the norm for below-the-hook devices. Devices may be modified to handle a particular load’s center of gravity, shape, or size. Engineering a custom lifting device is the smartest way to guarantee safe operation of both the load and the crane equipment. Customer and manufacturer enter the design process together to either re-engineer a standard below-the-hook device or design one specifically suited to an intended application.

There are a myriad of mechanical below-the-hook devices, but given the customization level and versatility of such tools, many devices may also be operated electronically, hydraulically, or pneumatically. Creating such a control system requires new designs for claws, hooks, tongs, and latches that are integrated into the overall design.



The Advantages of Using Below-the-Hook Lifting Devices

Below-the-hook devices provide an ideal solution for safe and efficient lifting. Traditional slings made of wire rope, alloy chain, or synthetic materials may be an easy method to put together quickly, but they won't move safely and securely for many loads with particular shapes, sizes, or weights. For many lift types, slings may swing or shift unpredictably, risking load spills or worker injuries.

Customers may seek out a qualified manufacturer to design a customized below-the-hook lifting device for a variety of reasons. These may include:

- Traditional rigging takes too long
- Unusual load shape
- Larger than normal load size
- Heavy load weight

Lifting points are often not as safe and secure as they could be. These points are often chosen out of convenience for the manufacturer of the load rather than for safety or efficiency. In cases such as this, a custom lifter can balance the load and allow safer movement.

To maintain full load control, custom below-the-hook devices are helpful and save the time you might otherwise spend trying to creatively attach your existing slings. Unbalanced loads with an off-kilter center of gravity, for example, will be much easier to manage with a custom lifter with a bail that may be adjusted. Balancing the load can be a main goal of the design.

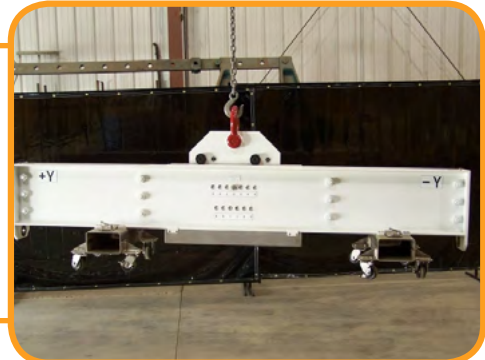


The Below-the-Hook Device Complete List

A variety of solutions exist for below-the-hook devices. Some of the more common options include:

Lifting Beams

With one long beam featuring a single top bail and at least two lifting points. Lifting beams require significantly less headroom than many other lifters.



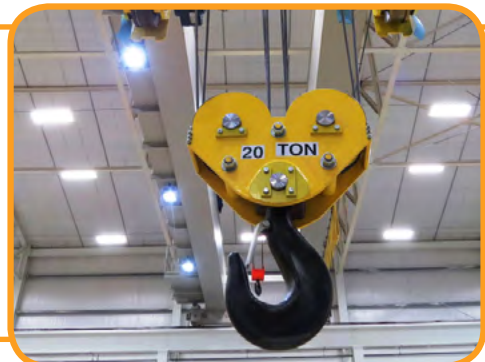
Spreader Beams

Spreader beams include top rigging such as wire rope, chain, or synthetic slings for load balance and maneuverability.



Custom Lower Blocks

Also called hook blocks, crane blocks, or load blocks, custom lower blocks use either cast iron or Nylatron Sheaves for better wire rope and heavy durability.



Custom-Engineered Lifting Devices

Aside from the more common below-the-hook lifters, myriad custom-engineered options also exist. These may include items such as:

- Magnet beams
- Rotating magnet beams
- Container grabs
- Container grabs for nuclear waste containers
- Motorized telescopic lifting beams
- Crane scale systems

Special Purpose Grapples

Some demanding applications may require highly customized solutions. Special purpose grapples serve a range of sectors that lift unusual or hazardous materials, or operate in harsh environments. Special purpose grapples may include features such as:

- Customizable for industrial and nuclear applications
- Stainless steel or carbon steel construction
- Remote operation
- NUREG 0554 and NUREG 0612 heavy lift systems
- Seismically qualified
- NQA-1 Nuclear Quality



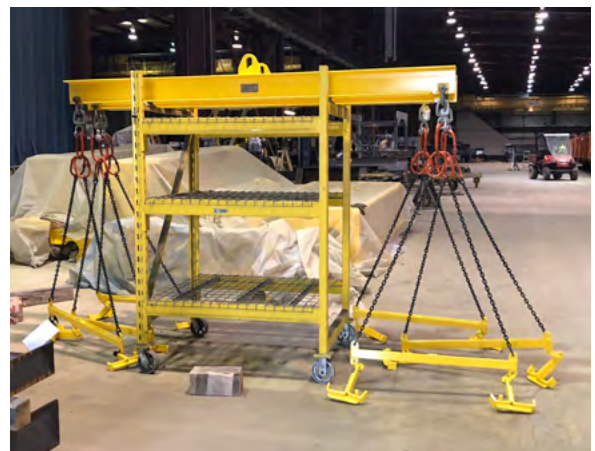
OSHA-Compliant Below-the-Hook Lifting Devices

When designing or purchasing below-the-hook lifting devices, the following standards will help you ensure your chosen solution is compliant with OSHA requirements. OSHA relies heavily on the ASME in the regulation of lifters.

ASME B30.20 Below-the-Hook Lifting Devices

These standards are comprehensive and address marking, installation, construction, and inspection, as well as maintenance, testing, and operation of equipment used to attach loads to hoists. Lifters regulated by this standard include:

- Structural lifting devices
- Mechanical lifting devices
- Remotely operated lifting magnets
- Operated close proximity lifting magnets
- Scrap grapples
- Material handling grapples



ASME BTH-1 Design of Below-the-Hook Lifting Devices

This standard involves the minimum structural and mechanical design criteria, as well as minimum electrical component selection criteria, for all lifting devices included in the above category. ASME BTH-1 design categories include:

Design Category A

Design Category A is used to regulate equipment used to lift predictable loads in controlled environments. As such, Design Category A covers most standard below-the hook lifters used in repeatable lifts, such as paint lines or rapid assembly in manufacturing centers. These loads are identical every time, which means there are no outside conditions that might impact any given individual lift. Design Category A devices are limited to Service Class 0 only.

Design Category B

Design Category B regulates equipment used in conditions that aren't as uniform as Design Category A. Due to unpredictable load variance and/or indeterminable environmental factors, loads moved by Design Category B equipment cannot be standardized. Most below-the-hook lifting devices fall into this category between Service Class 0-4, and require appropriate design factors.



OSHA Inspection Requirements for Below the Hook Devices

To achieve compliance with ASME and OSHA standards, below-the-hook lifting devices must undergo regular inspections and meticulous inspection records must be maintained. Three types of recurrent inspections are required, according to ASME B30.20:

Before and During Each Lift

These inspections must be made before and during each lift that involves the lifter.

Frequent Inspections

Visual examinations must be conducted by the operator or another designated person regularly. Records of this inspection are not required by regulations, but you might consider keeping them regardless. Frequent inspections should be conducted monthly for equipment under normal service, weekly for equipment in heavy operation, and daily or multiple times a week if the service level of the equipment can be considered severe. If service is special or infrequent, get a recommendation from a qualified person before and after each occurrence.

Periodic Inspections

Reevaluating the external conditions periodically with a qualified person helps determine the future inspection schedule. If not keeping records, an external code mark on the lifter is an acceptable identification. Typically this will happen yearly with normal service, semi-annually with heavy service, and quarterly with severe service. If service is special or infrequent, a qualified person should make a recommendation before the first occurrence and then offer a suggested schedule for subsequent occurrences.



Increased Efficiency = Increased Safety

Below-the-hook lifting devices will increase the efficiency of your lifts, resulting in more lifts per shift. Risk to workers and surrounding property and infrastructure can also be significantly reduced through the superior load control offered by below-the-hook devices.

For more information about customizing a safe, secure, and efficient below-the-hook lifter for your operation, please don't hesitate to [contact us](#) or [request a quote](#).





“In an increasingly complicated marketplace, it is nice to know about a company whose capabilities you can rely on. At American Crane & Equipment Corporation, we are uniquely positioned to provide our customers with a single source to satisfy material handling requirements. This integrated approach includes project managers, engineers, complete manufacturing facilities and service technicians to help you with your material handling needs. Our company has a long standing reputation as a leading supplier of quality equipment and engineering services to customers throughout the world. American Crane & Equipment Corporation is here to make your job easier.”

Oddvar Norheim, President and CEO

A handwritten signature in white ink, appearing to read "Oddvar Norheim".

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