

jib crane drawing

jib crane drawing is an essential aspect of designing and manufacturing jib cranes that meet specific operational requirements and safety standards. A detailed jib crane drawing provides engineers, fabricators, and installers with precise information on dimensions, load capacities, materials, and assembly instructions. This article explores the importance of jib crane drawings, the types of drawings commonly used, and key elements that must be included. Additionally, it covers technical considerations, software tools for creating accurate drawings, and best practices for interpreting and utilizing jib crane designs effectively. Understanding jib crane drawings is crucial for ensuring efficient crane operation, compliance with regulations, and longevity of the equipment. The following sections offer an in-depth look into these facets, making it a valuable resource for professionals involved in crane design and application.

- Importance of Jib Crane Drawings
- Types of Jib Crane Drawings
- Key Components in Jib Crane Drawings
- Technical Specifications and Standards
- Software Tools for Creating Jib Crane Drawings
- Best Practices for Reading and Using Jib Crane Drawings

Importance of Jib Crane Drawings

Jib crane drawings serve as the foundational blueprint that guides the entire process of crane manufacturing, installation, and maintenance. These drawings ensure that every stakeholder has a clear understanding of the crane's design parameters, structural integrity, and functional capabilities. Accurate jib crane drawings help prevent costly errors during fabrication and assembly by providing precise measurements and material specifications. Moreover, they facilitate compliance with safety standards and regulatory requirements, which is critical for workplace safety and legal adherence. Proper documentation through detailed drawings also enables easier troubleshooting and maintenance throughout the crane's operational lifecycle.

Role in Design and Fabrication

During the design phase, jib crane drawings allow engineers to visualize the

crane's structure and make necessary adjustments based on load calculations and spatial constraints. Fabricators rely on these drawings to cut, weld, and assemble components accurately. The drawings act as a common language between designers, engineers, and manufacturers, ensuring consistency and quality in the final product.

Enhancing Safety and Compliance

Safety regulations mandate strict adherence to design and load-bearing specifications. Jib crane drawings include critical load charts, safety factors, and material grades that prevent structural failures and accidents. Inspectors and safety officers use these documents to verify that the crane meets all applicable standards before commissioning.

Types of Jib Crane Drawings

Several types of jib crane drawings exist, each serving a distinct purpose within the project lifecycle. Understanding these types helps professionals select the appropriate drawing for their needs, whether it is conceptual design, detailed manufacturing, or installation guidance.

Conceptual Drawings

Conceptual jib crane drawings provide an initial overview of the crane's design, illustrating the general layout, size, and functionality. These drawings are typically less detailed and used during the early stages of project planning to communicate ideas and evaluate feasibility.

Detailed Fabrication Drawings

Detailed fabrication drawings include comprehensive information on dimensions, welding details, materials, and component specifications. These are essential for manufacturing the crane components and ensuring that the assembly meets design requirements.

Assembly Drawings

Assembly drawings depict how individual components fit together to form the complete jib crane. They include exploded views, bolt patterns, and instructions necessary to guide the installation team in assembling the crane safely and correctly.

Load and Stress Analysis Drawings

These technical drawings present the results of engineering analyses, including load distribution, stress points, and safety margins. They help engineers verify the structural soundness of the design under operational conditions.

Key Components in Jib Crane Drawings

A comprehensive jib crane drawing must clearly identify all major components and their specifications to ensure proper construction and function. These components are fundamental to the crane's operation and safety.

Base and Mast

The base and mast are critical structural elements that support the entire jib crane. Drawings detail the size, material thickness, mounting methods, and anchoring systems used to secure these components to the floor or supporting structure.

Jib Arm

The jib arm extends horizontally from the mast and carries the hoist and trolley. Its dimensions, material grade, and reinforcement details are specified to withstand the expected loads and moments.

Hoist and Trolley Mechanism

Drawings illustrate the positioning and mounting of the hoist and trolley along the jib arm. Details include travel limits, motor specifications, and control wiring to ensure smooth and safe lifting operations.

Rotation and Slewing Mechanism

The rotation mechanism allows the jib crane to pivot around the mast. Drawings specify bearings, gearboxes, and locking devices to control movement and maintain stability during operation.

- Load capacity and rating plates
- Safety stops and limit switches
- Electrical control panels and wiring

- Protective coatings and corrosion resistance details

Technical Specifications and Standards

Jib crane drawings must comply with industry standards and technical specifications to guarantee safe and efficient performance. These standards govern material selection, design loads, fabrication practices, and testing procedures.

Material Standards

Specifications for steel grades, welding materials, and fasteners are defined within the drawings, referencing standards such as ASTM or ISO. Proper material selection ensures durability and structural integrity under varying environmental conditions.

Load Ratings and Safety Factors

Drawings include calculated load capacities, factoring in dynamic and static loads, as well as safety margins. These ratings comply with standards like ASME B30.11 to prevent overloading and potential failures.

Installation and Testing Requirements

Technical drawings often incorporate guidelines for crane installation, including anchoring torque values and alignment tolerances. Additionally, they may specify testing protocols such as load testing and certification requirements to validate the crane's readiness for operation.

Software Tools for Creating Jib Crane Drawings

Modern engineering relies on advanced software tools to create precise and detailed jib crane drawings. These digital platforms improve accuracy, ease revisions, and facilitate collaboration among project stakeholders.

Computer-Aided Design (CAD) Software

CAD software like AutoCAD, SolidWorks, and Inventor is widely used to generate 2D and 3D jib crane drawings. These tools enable designers to model complex geometries, simulate load conditions, and produce fabrication-ready documentation.

Finite Element Analysis (FEA) Software

FEA software assists in structural analysis by simulating stresses, deformations, and load distribution within the crane components. Integrating FEA results into drawings enhances the reliability of the design and helps optimize material usage.

Collaboration and Documentation Tools

Project management and cloud-based platforms allow teams to share, review, and update jib crane drawings in real time. This integration ensures consistency across all project phases and streamlines communication between engineers, fabricators, and clients.

Best Practices for Reading and Using Jib Crane Drawings

Proper interpretation and utilization of jib crane drawings are vital for successful project execution. Following best practices minimizes errors and enhances safety throughout the crane's lifecycle.

Thorough Review and Verification

Before fabrication or installation, all drawings should be carefully reviewed to verify dimensions, material specifications, and compliance with design criteria. Cross-checking with load calculations and standards ensures accuracy and prevents costly rework.

Clear Documentation and Markings

Drawings must include legible labels, notes, and symbols to convey all necessary information unambiguously. This clarity supports effective communication among diverse teams involved in the project.

Training and Familiarization

Personnel responsible for manufacturing, assembling, or maintaining the jib crane should receive training on interpreting the drawings correctly. Familiarity with technical symbols and conventions improves efficiency and safety during all phases.

1. Verify all measurements and tolerances carefully.

2. Confirm material grades and welding specifications.
3. Follow assembly sequences as depicted in the drawings.
4. Adhere strictly to safety and load ratings indicated.
5. Maintain updated records of drawing revisions and approvals.

Frequently Asked Questions

What is a jib crane drawing?

A jib crane drawing is a technical illustration or blueprint that shows the design, structure, and components of a jib crane, which is a type of crane with a horizontal arm (jib) that supports a movable hoist.

What details are typically included in a jib crane drawing?

A jib crane drawing typically includes dimensions, load capacity, mounting details, materials used, the range of motion, hoist type, and structural components such as the mast, jib arm, base, and foundation.

How can I create an accurate jib crane drawing?

To create an accurate jib crane drawing, use CAD software like AutoCAD or SolidWorks, ensure all measurements and load specifications are precise, follow engineering standards, and include all mechanical and structural details.

Are there standard symbols used in jib crane drawings?

Yes, jib crane drawings often use standard mechanical and electrical symbols to represent components such as motors, hoists, pulleys, and controls, following industry conventions and standards like ISO or ANSI.

Where can I find free jib crane drawing templates?

Free jib crane drawing templates can be found on engineering forums, CAD libraries, websites like GrabCAD or TraceParts, and sometimes from equipment manufacturers' websites offering technical resources.

What is the importance of a jib crane drawing in construction projects?

A jib crane drawing is crucial in construction projects as it provides detailed guidance for manufacturing, installation, and safety checks, ensuring the crane is built and operated according to specifications and regulations.

How do I interpret load capacity in a jib crane drawing?

Load capacity in a jib crane drawing is usually indicated in the specifications section and may be noted near the jib arm or hoist. It represents the maximum weight the crane can safely lift, which must not be exceeded.

Can jib crane drawings be used for maintenance purposes?

Yes, jib crane drawings are valuable for maintenance as they help technicians understand the crane's design, locate components, identify parts for replacement, and perform inspections and repairs accurately.

Additional Resources

1. Jib Crane Design and Drafting Guide

This comprehensive guide covers the fundamental principles of designing jib cranes, focusing on structural integrity and load capacity. It provides detailed drafting techniques and CAD examples to help engineers and designers create accurate crane drawings. The book also includes safety standards and industry best practices to ensure compliance and reliability.

2. Practical Jib Crane Drawing Techniques

A hands-on manual for professionals involved in crane design and fabrication, this book emphasizes practical drawing skills. It features step-by-step instructions on creating precise jib crane schematics, including dimensions, materials, and mechanical components. Readers will find tips on interpreting engineering blueprints and integrating electrical and control systems into their drawings.

3. Structural Analysis and Drawing of Jib Cranes

Focusing on the structural aspects, this book teaches how to analyze stresses and forces acting on jib cranes and translate those calculations into detailed drawings. It bridges the gap between theoretical engineering concepts and practical drafting. The text includes numerous examples of structural drawings for different types of jib cranes.

4. CAD Modeling for Jib Crane Design

This book introduces modern computer-aided design (CAD) tools for creating accurate and efficient jib crane drawings. It covers software tutorials, 3D modeling techniques, and rendering methods tailored to crane components and assemblies. Engineers and drafters will benefit from the detailed instructions on simulating crane movements and load distributions.

5. Standards and Specifications for Jib Crane Drawings

An essential reference for ensuring jib crane drawings meet industry standards, this book outlines relevant codes and regulations. It explains the documentation requirements for design approval and fabrication. The book also discusses how to incorporate compliance criteria into detailed crane drawings to facilitate safe manufacturing and installation.

6. Mechanical Components and Drawing of Jib Cranes

This title delves into the mechanical parts of jib cranes, such as hoists, trolleys, and slewing mechanisms, and their representation in technical drawings. It provides detailed illustrations and explanations for drafting each component accurately. The book is ideal for mechanical engineers and drafters who need to produce comprehensive crane assembly drawings.

7. Jib Crane Blueprint Reading and Interpretation

Designed for practitioners who work with jib crane drawings, this book teaches how to read and interpret blueprints effectively. It covers symbols, notation, and layout conventions specific to jib cranes. The guide helps technicians, inspectors, and engineers understand design intent and verify the accuracy of crane drawings.

8. Fabrication Drawings for Jib Cranes

This practical book focuses on creating fabrication-ready drawings for jib crane manufacturing. It details the necessary views, dimensions, and tolerances required to guide shop floor production. The text also discusses material selection and welding symbols to ensure that drawings provide clear instructions for fabricators.

9. Maintenance and Modification Drawings for Jib Cranes

A specialized resource for maintaining and upgrading jib cranes, this book covers how to produce and update drawings for repair and modification projects. It includes case studies illustrating common maintenance scenarios and how to document changes accurately. The book is valuable for maintenance engineers and technical illustrators involved in crane lifecycle management.

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Jib Crane Drawing: A Comprehensive Guide

Ebook Title: Jib Crane Design and Construction: A Practical Guide

Ebook Outline:

Introduction: The world of jib cranes, their applications, and the importance of accurate drawings.

Chapter 1: Understanding Jib Crane Components: Detailed breakdown of all major parts and their functions.

Chapter 2: Types of Jib Cranes: Exploring various designs and their suitability for different applications.

Chapter 3: Drawing Standards and Conventions: Industry-standard practices for creating clear and unambiguous drawings.

Chapter 4: Creating Jib Crane Drawings: A Step-by-Step Guide: Practical walkthrough with examples.

Chapter 5: Calculations and Specifications: Essential calculations for determining load capacity, structural integrity, and safety factors.

Chapter 6: Material Selection and Fabrication: Choosing appropriate materials and outlining fabrication techniques.

Chapter 7: Safety Considerations and Regulations: Compliance with safety standards and best practices.

Conclusion: Recap of key concepts and future trends in jib crane design.

Jib Crane Drawing: A Comprehensive Guide

Introduction: The Importance of Accurate Jib Crane Drawings

Jib cranes are indispensable lifting devices used across diverse industries, from manufacturing and construction to warehousing and shipping. Their versatility and relative simplicity make them a cost-effective solution for many material handling needs. However, the safe and efficient operation of a jib crane is entirely dependent on its design and construction, which are meticulously documented through detailed drawings. These drawings are not merely visual representations; they are crucial engineering documents that serve as blueprints for fabrication, installation, maintenance, and even future modifications. An inaccurate or incomplete jib crane drawing can lead to catastrophic failures, resulting in costly repairs, equipment damage, and, most importantly, serious injury or even death. This comprehensive guide will delve into the intricacies of jib crane drawings, exploring their components, creation, and the crucial role they play in ensuring operational safety and efficiency.

Chapter 1: Understanding Jib Crane Components

A jib crane comprises several key components, each playing a vital role in its overall functionality. Understanding these components is paramount to interpreting and creating accurate drawings. The primary components include:

Jib: The horizontal arm extending from the mast, supporting the hoist trolley. Drawings must accurately depict its length, material, and structural bracing.

Mast: The vertical support structure, often affixed to a floor, wall, or ceiling. Drawings should specify its height, material, and base fixation details.

Hoist Trolley: The mechanism that moves along the jib, allowing for horizontal movement of the load. Its specifications, including capacity and travel distance, need precise representation.

Hoist: The lifting mechanism, either electric or manual, responsible for raising and lowering the load. Detailed drawings should include its capacity, lifting speed, and power source.

Slewing Mechanism: This allows the entire jib structure to rotate, increasing the crane's reach. Drawings must show the type of mechanism (manual or powered) and its rotation limits.

Base: The foundation upon which the entire crane rests, providing stability. Drawings should specify its type (floor mount, wall mount, or ceiling mount) and anchoring details.

Limit Switches: Safety devices that prevent the hoist from exceeding its vertical travel limits or the slewing mechanism from exceeding its rotational limits. Their placement and specifications need to be clearly shown.

Chapter 2: Types of Jib Cranes

Various jib crane designs cater to specific needs and applications. Accurate drawings must clearly identify the type of crane being depicted. Common types include:

Wall-Mounted Jib Cranes: These are fixed to a wall, ideal for smaller workshops or areas with limited floor space.

Free-Standing Jib Cranes: These are self-supporting structures, typically mounted on a base plate, offering greater flexibility in placement.

Column-Mounted Jib Cranes: These are mounted on a central column, often used in larger industrial settings.

Articulating Jib Cranes: These feature a pivoting jib, allowing for increased reach and maneuverability.

Overhead Jib Cranes: These have the jib suspended from an overhead track system.

Chapter 3: Drawing Standards and Conventions

Consistent adherence to industry-standard drawing practices is vital for clarity and unambiguous communication. This includes:

Scale and Units: The drawing scale and units of measurement (e.g., millimeters or inches) must be clearly indicated.

Dimensions and Tolerances: All critical dimensions should be specified with appropriate tolerances to account for manufacturing variations.

Material Specifications: Materials used in each component should be indicated using standard material designations.

Section Views and Details: Detailed views showing cross-sections and specific components are essential for clarity.

Bill of Materials: A comprehensive list of all components, their quantities, and material specifications.

Standard Symbols and Annotations: Using standardized symbols for components and annotations for notes and specifications.

Chapter 4: Creating Jib Crane Drawings: A Step-by-Step Guide

Creating accurate jib crane drawings involves a systematic process:

1. Gather Requirements: Determine the crane's capacity, reach, and intended application.
2. Select Crane Type: Choose the most appropriate jib crane design based on the requirements.
3. Sketch Initial Design: Create a preliminary sketch showing the overall layout and key components.
4. Detailed Drawings: Develop detailed drawings of each component, including dimensions, materials, and tolerances.
5. Assembly Drawing: Create an assembly drawing showing the relationship between all components.
6. Bill of Materials: Compile a comprehensive bill of materials.
7. Review and Revision: Thoroughly review the drawings for accuracy and completeness before finalization.

Chapter 5: Calculations and Specifications

Accurate calculations are crucial to ensure structural integrity and safe operation. These include:

Load Calculations: Determining the maximum safe working load (SWL) considering factors like jib length, hoist capacity, and safety factors.

Stress Calculations: Analyzing stresses on various components under different load conditions.

Stability Calculations: Ensuring the crane's stability under maximum load conditions.

Deflection Calculations: Calculating the deflection of the jib under load to ensure it remains within acceptable limits.

Chapter 6: Material Selection and Fabrication

The choice of materials significantly impacts the crane's durability, weight, and cost. Common materials include:

Steel: A strong and versatile material commonly used for jibs, masts, and other structural components.

Aluminum: A lighter-weight option suitable for applications where weight is a concern.

Fabrication Techniques: Common techniques include welding, bolting, and riveting. The drawings should specify the appropriate techniques for each joint.

Chapter 7: Safety Considerations and Regulations

Adhering to relevant safety standards and regulations is paramount:

Compliance with Standards: Drawings must reflect compliance with relevant national and international safety standards (e.g., ASME, OSHA).

Safety Features: The drawings should include details of safety features like limit switches, emergency stops, and load indicators.

Regular Inspections: Drawings should facilitate regular inspection and maintenance procedures.

Conclusion: The Ongoing Importance of Jib Crane Drawings

Accurate and detailed jib crane drawings are not simply a formality; they are the cornerstone of safe and efficient operation. From initial design to ongoing maintenance, these drawings are indispensable tools that guarantee the longevity and reliability of these vital pieces of material handling equipment. Understanding the principles discussed in this guide will enable engineers, designers, and fabricators to create and interpret jib crane drawings effectively, contributing to a safer and more productive workplace.

FAQs:

1. What software is best for creating jib crane drawings? AutoCAD, SolidWorks, and other CAD software are commonly used.
2. What are the typical tolerances for jib crane dimensions? Tolerances vary depending on the component and application but are usually specified on the drawing.
3. How often should jib crane drawings be reviewed? Regular reviews are recommended, especially after modifications or repairs.
4. What are the key safety considerations when designing a jib crane? Load capacity, stability, and the incorporation of safety features are crucial.
5. What are the common causes of jib crane failures? Overloading, improper maintenance, and design flaws are major causes.
6. How do I determine the appropriate material for a jib crane? Consider factors like strength, weight, and corrosion resistance.
7. Where can I find relevant safety standards for jib crane design? Consult national and international standards organizations.
8. What is the role of a bill of materials in jib crane drawings? It lists all components, quantities, and materials needed for construction.
9. How do I calculate the safe working load of a jib crane? Use appropriate engineering formulas, considering factors like jib length and hoist capacity.

Related Articles:

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2. Gantry Crane Design: A detailed explanation of gantry crane design principles.
3. Electric Hoist Selection Guide: Choosing the right electric hoist for your jib crane.
4. Jib Crane Maintenance and Inspection: A practical guide to maintaining and inspecting jib cranes.
5. Safety Regulations for Crane Operation: A comprehensive overview of crane safety regulations.
6. Types of Crane Hooks and Their Applications: Exploring different crane hook designs and their uses.
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8. Understanding Crane Load Charts: Interpreting and using crane load charts for safe operation.
9. Common Jib Crane Problems and Troubleshooting: Diagnosing and solving common jib crane issues.

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