Compendium on Cranes

BUREAU OF INDIAN STANDARDS

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MED 14: Cranes, Lifting Chains and Related Equipment

Cranes are an important category of material handling equipment used for lifting, lowering, and moving heavy loads in industries such as construction, manufacturing, ports, shipyards, and infrastructure development. These machines enable efficient handling of bulky and heavy materials, improving productivity, safety, and operational efficiency in large-scale industrial and construction activities.

Various types of cranes are used depending on operational requirements, including mobile cranes, tower cranes, overhead travelling cranes, gantry cranes, portal cranes, and jib cranes. Each type is designed for specific applications—for example, tower cranes are commonly used in high-rise construction, while overhead travelling cranes are widely used in factories and workshops for internal material handling.

Modern crane systems increasingly incorporate advanced technologies such as load monitoring systems, anti-collision devices, telematics, and automated safety controls. These innovations enhance lifting accuracy, improve operator safety, and support efficient equipment monitoring and maintenance.

Standardization of cranes and lifting accessories is essential to ensure safety, reliability, and performance consistency. The Bureau of Indian Standards (BIS) through the MED 14 — Cranes, Lifting Chains and Related Equipment Sectional Committee is responsible for developing and maintaining these standards in India, supporting safe operations and alignment with international practices.

Mobile Cranes

i) IS/ISO 4301: Part 2: 2022 Cranes Classification Part 2 Mobile Cranes (First Revision)

This standard specifies the classification of mobile cranes based on their operating conditions and duty cycles. IS/ISO 4301 (Part 2): 2022 provides guidelines for determining the crane class by considering factors such as load spectrum, frequency of use, and operating time. The classification system helps in the proper design, selection, and safe operation of mobile cranes. It also assists manufacturers, designers, and users in ensuring that cranes are suitable for their intended applications and operating environments.

ii) IS 16860: Part 2: 2021 Cranes Graphical Symbols Part 2 Mobile Cranes

This standard specifies graphical symbols used on mobile cranes to represent various controls, functions, and operational indicators. IS 16860 (Part 2): 2021 provides standardized symbols that help operators easily identify crane controls and understand machine functions during operation. The use of uniform graphical symbols improves clarity, reduces the risk of operational errors, and enhances safety during crane operation. The standard supports manufacturers and users in ensuring consistent marking and communication of control functions on mobile cranes.

iii) IS 4573: 2020 Power Driven Mobile Cranes — Specification (Second Revision)

This standard specifies the requirements for the design, construction, performance, and testing of power driven mobile cranes used for lifting and material handling operations. IS 4573: 2020 provides guidelines to ensure that mobile cranes meet the necessary safety, operational, and structural requirements for reliable performance. The standard covers aspects such as load capacity, stability, safety features, inspection, and testing procedures. It supports manufacturers, users, and regulatory bodies in ensuring safe and efficient use of power driven mobile cranes in construction, industrial, and infrastructure applications.

iv) IS 14469: 2018 Mobile cranes - Determination of stability (First Revision)

This standard specifies the methods for determining the stability of mobile cranes under different operating conditions. IS 14469: 2018 provides guidelines for evaluating the stability limits of mobile cranes, including factors such as load, boom configuration, operating radius, and ground conditions. The standard outlines procedures to ensure that cranes operate safely without the risk of overturning during lifting operations. It helps manufacturers, designers, and operators assess crane stability and maintain safe lifting performance in various working environments.

v) IS 13572: Part 2: 2018 Cranes - Crane operating manual: Part 2 mobile cranes

This standard specifies the requirements for the preparation and content of operating manuals for mobile cranes. IS 13572 (Part 2): 2018 outlines the essential information that manufacturers should provide to ensure safe and efficient operation of mobile cranes. It includes guidance on installation, operating procedures, maintenance instructions, safety precautions, inspection requirements, and emergency measures. The standard helps ensure that operators and maintenance personnel have clear and comprehensive instructions for the proper use and upkeep of mobile cranes.

vi) IS 13558: Part 2: 2018 Cranes – Control layout and characteristics: Part 2 basic arrangement and requirements For Mobile Cranes (First Revision)

This standard specifies the control layout and operational characteristics for mobile cranes to ensure safe and efficient operation. IS 13558 (Part 2): 2018 provides requirements for the arrangement, identification, and functioning of controls used in mobile cranes, ensuring that operators can easily understand and operate them. The standard aims to improve operator safety, reduce the risk of operational errors, and promote uniformity in crane control systems across different mobile crane models. It also supports manufacturers in designing control systems that enhance reliability, safety, and ease of operation.

Tower Cranes

i) IS 13834: Part 3: 2023 Cranes - Classification Part 3 Tower Cranes (First revision)

This standard specifies the classification of tower cranes based on their operating conditions, duty cycles, and usage patterns. IS 13834 (Part 3): 2023 provides guidelines for determining the appropriate crane class by considering factors such as load spectrum, frequency of operation, and working time. The classification helps ensure proper design, selection, and safe operation of tower cranes for various applications. It supports manufacturers, designers, and users in choosing cranes suitable for specific operational requirements and working environments.

ii) IS 14473: Part 3: 2022 Cranes Inspections - Part 3 Tower Cranes

This standard specifies the requirements for inspection of tower cranes to ensure safe and reliable operation. IS 14473 (Part 3): 2022 provides guidelines for different types of inspections, including initial, periodic, and special inspections, covering structural components, mechanical systems, and safety devices. The standard aims to identify defects, wear, and potential failures to prevent accidents and ensure continued serviceability. It assists operators, maintenance personnel, and inspection authorities in maintaining the safety and performance of tower cranes.

iii) IS/ISO 8686: Part 3: 2018 Cranes Design Principles For Loads And Load Combinations Part 3 Tower Cranes

This standard specifies the design principles for determining loads and load combinations applicable to tower cranes. IS/ISO 8686 (Part 3): 2018 provides guidelines for evaluating various types of loads such as lifted loads, wind loads, dynamic effects, and operational forces acting on tower cranes. It outlines the combinations of these loads to ensure safe and reliable structural design. The standard assists designers and manufacturers in ensuring that tower cranes are capable of withstanding different loading conditions during operation, thereby enhancing safety and structural integrity.

iv) IS 13558: Part 3: 2018 Cranes - Control layout and characteristics: Part 3 tower cranes (First Revision)

This standard specifies the control layout and operational characteristics for tower cranes to ensure safe and efficient operation. IS 13558 (Part 3): 2018 provides requirements for the arrangement, identification, and functioning of controls used in tower cranes. It aims to ensure that operators can easily understand and operate the controls, thereby reducing the risk of errors and enhancing safety. The standard also promotes uniformity in control systems and assists manufacturers in designing reliable and user-friendly crane control layouts.

v) IS 16860: Part 3: 2018 Cranes - Graphical symbols: Part 3 tower cranes

This standard specifies graphical symbols used on tower cranes to represent various controls, indicators, and operational functions. Part 3 of IS 16860: 2018 provides standardized symbols that enable crane operators to easily recognize and understand the controls and functions during operation. The use of uniform graphical symbols improves operational clarity, reduces the risk of errors, and enhances safety in crane operations. The standard also assists manufacturers and users in ensuring consistent marking and identification of controls on tower cranes.

Overhead Bridge Gantry Cranes

i) IS 13558 (Part 5):2024 Cranes-Control Layout and Characteristics - Part 5 Bridge and Gantry Crane

This standard specifies the control layout and operational characteristics for bridge and gantry cranes to ensure safe and efficient operation. IS 13558 (Part 5): 2024 provides requirements for the arrangement, identification, and functioning of controls used in these cranes. It ensures that operators can easily understand and operate the controls, thereby reducing the risk of errors and enhancing safety. The standard also promotes uniformity in control systems and assists manufacturers in designing reliable and user-friendly crane control layouts.

ii) IS 13559 (Part 5):2023 Cranes - Information To Be Provided Part 5 Overhead Travelling Cranes And Portal Bridge Cranes

This standard specifies the information to be provided by manufacturers for overhead travelling cranes and portal bridge cranes. The requirements given in Part 5 of IS 13559: 2023 include details to be covered in technical documentation such as specifications, operating instructions, safety guidelines, and maintenance procedures. It ensures that operators, users, and maintenance personnel receive adequate and clear information for safe and efficient crane operation. The standard also promotes consistency and completeness in documentation supplied with cranes.

iii) IS 3177: 2020 Electric Overhead Travelling Crane and Gantry Crane for all Applications — Code of Practice (Third Revision)

This standard provides a code of practice for the design, erection, testing, and safe operation of electric overhead travelling cranes and gantry cranes used in various industrial applications. IS 3177: 2020 outlines requirements related to structural components, mechanical and electrical systems, load handling, and safety features. It also includes guidelines for inspection, maintenance, and testing to ensure reliable and efficient crane performance. The standard assists manufacturers, engineers, and users in ensuring safe operation and compliance with established engineering practices.

iv) IS/ISO 8686-5:2017 Cranes - design principles for loads and load combinations part 5 overhead travelling and portal bridge cranes

This standard specifies the design principles for determining loads and load combinations applicable to overhead travelling and portal bridge cranes. IS/ISO 8686 (Part 5): 2017 provides guidelines for evaluating various loads such as lifted loads, dynamic effects, wind forces, and operational conditions acting on these cranes. It outlines appropriate load combinations to ensure safe and reliable structural design. The standard assists designers and manufacturers in ensuring that cranes can withstand different loading conditions, thereby enhancing safety and structural integrity during operation.

Jib Cranes

i) IS/ISO 8686-4:2005 Cranes — Design Principles Loads and Load Combinations Part 4 Jib Cranes

This standard specifies the design principles for determining loads and load combinations applicable to jib cranes. The guidelines given in IS/ISO 8686 (Part 4): 2005 cover evaluation of various loads such as lifted loads, dynamic effects, and environmental forces acting on jib cranes. It also defines appropriate load combinations to ensure safe and reliable structural design. The standard assists designers and manufacturers in ensuring that jib cranes can withstand different operating conditions, thereby enhancing safety and structural performance.

ii) IS 15419:2004 Jib Cranes - Code of Practice

This standard provides a code of practice for the design, installation, operation, and maintenance of jib cranes used in material handling applications. The guidelines specified in IS 15419: 2004 cover structural requirements, load handling, safety provisions, and operational practices. It ensures that jib cranes are designed and used safely and efficiently under various working conditions. The standard assists manufacturers, engineers, and users in maintaining reliability, safety, and performance of jib cranes.

iii) IS 13834 (Part 4):1993 Cranes - Classification: Part 4 Jib cranes

This standard specifies the classification of jib cranes based on their operating conditions and duty cycles. The provisions of IS 13834 (Part 4): 1993 provide guidelines for determining crane classes by considering factors such as load spectrum, frequency of use, and working time. The classification helps in proper design, selection, and safe operation of jib cranes for various applications. It assists manufacturers, designers, and users in ensuring that cranes are suitable for specific service conditions and performance requirements.

iv) IS 13558 (Part 4): 1993 Cranes - Controls - Layout and characteristics: Part 4 Jib cranes

This standard specifies the requirements for the layout and characteristics of controls used in jib cranes. The provisions of IS 13558 (Part 4): 1993 cover the arrangement, identification, and operation of controls to ensure ease of use and safety. It helps operators to clearly understand and operate crane controls, thereby reducing the risk of errors. The standard also promotes uniformity in control systems and assists manufacturers in designing safe and user-friendly control layouts for jib cranes.

Loader Cranes

i) IS/ISO 15442:2012 Safety Requirements for Loader Cranes

This standard specifies the safety requirements for loader cranes used for lifting and loading operations. The provisions of IS/ISO 15442: 2012 cover design, construction, operation, and safety features to minimize risks during crane use. It includes requirements related to stability, load handling, control systems, and protective devices. The standard assists manufacturers, operators, and users in ensuring safe and reliable operation of loader cranes in various working conditions.

Hoists & Winches (All Types – Electric, Manual, Builders, Chain, Wire Rope)

i) IS 11340: 2020 Ratchet Lever Hoist — Specification (First Revision)

This standard specifies the requirements for ratchet lever hoists used for lifting, pulling, and tensioning operations. The provisions of IS 11340: 2020 cover design, construction, materials, performance, and safety requirements to ensure reliable operation. It includes guidelines related to load capacity, mechanical components, testing, and inspection. The standard assists manufacturers and users in ensuring safe, efficient, and durable performance of ratchet lever hoists in various applications.

ii) IS/ISO 4309: 201 Cranes - Wire Ropes - Care and Maintenance, Inspection and Discard

This standard specifies guidelines for the care, maintenance, inspection, and discard of wire ropes used in crane operations. The provisions of IS/ISO 4309: 2017 cover procedures for regular inspection, identification of defects, wear, corrosion, and criteria for removal from service. It helps ensure safe and reliable performance of wire ropes during lifting operations. The standard assists operators, maintenance personnel, and inspectors in maintaining safety and extending the service life of wire ropes.

iii) IS 6547: 2015 Electric chain hoists – Specification (First Revision)

This standard specifies the requirements for electric chain hoists used in lifting and material handling operations. The provisions given in IS 6547: 2015 cover design, construction, performance, and safety requirements to ensure reliable operation. It includes guidelines related to load capacity, mechanical and electrical components, testing, and inspection. The standard assists manufacturers and users in ensuring safe, efficient, and durable performance of electric chain hoists in various industrial applications.

iv) IS 807: 2006 Design, erection and testing (Structural Portion) of cranes and hoists - Code of Practice (Second Revision)

This standard provides a code of practice for the design, erection, and testing of the structural portions of cranes and hoists. The guidelines specified in IS 807: 2006 cover aspects such as structural design, material selection, fabrication, and load considerations to ensure strength and stability. It also includes provisions for erection procedures and testing to verify structural integrity and performance. The standard assists engineers, manufacturers, and users in ensuring safe, reliable, and durable crane and hoist structures.

v) IS 3832: 2005 Hand - Operated chain pulley block – Specification (Third Revision)

This standard specifies the requirements for hand-operated chain pulley blocks used for lifting loads in industrial and material handling applications. The provisions of IS 3832: 2005 cover design, construction, materials, performance, and safety requirements to ensure reliable operation. It includes guidelines related to load capacity, mechanical components, testing, and inspection. The standard assists manufacturers and users in ensuring safe, efficient, and durable performance of chain pulley blocks.

vi) IS 13156: 1991 Sheave pulley blocks for wire rope – Specification

This standard specifies the requirements for sheave pulley blocks used with wire ropes in lifting and material handling operations. The provisions of IS 13156: 1991 cover design, construction, materials, and performance requirements to ensure safe and efficient operation. It includes guidelines related to load capacity, dimensions, and testing of pulley blocks. The standard assists manufacturers and users in ensuring reliability, durability, and safety of sheave pulley blocks in various applications.

Chain slings and lifting chain

i) IS 2760:2025 Steel Chain Slings Specification

This standard specifies the requirements for steel chain slings used in lifting and material handling operations. The provisions of IS 2760: 2025 cover material selection, design, fabrication, and assembly of chain slings to ensure adequate strength and durability under working loads. It includes requirements for mechanical properties, dimensional tolerances, and load ratings for different types of slings. The standard also outlines procedures for proof testing, inspection, marking, and certification to ensure compliance and traceability. Additionally, it provides guidelines for safe usage and maintenance to enhance service life. It assists manufacturers, inspectors, and users in ensuring safe, reliable, and efficient performance of steel chain slings in various industrial applications.

ii) IS 5604: 2025 Hand-Operated Universal Gearless Pulling and Lifting Machines Specification (Second Revision)

This standard specifies the requirements for hand-operated universal gearless pulling and lifting machines used for manual handling operations. The provisions of IS 5604 : 2025 cover design, construction, materials, and performance characteristics to ensure reliable and efficient operation without the use of gears. It includes requirements related to load capacity, braking mechanisms, operating effort, and safety features. The standard also outlines procedures for testing, inspection, marking, and certification to verify performance and compliance. Additionally, it provides guidelines for safe operation and maintenance to ensure durability and long service life. It assists manufacturers and users in ensuring safe, efficient, and dependable manual pulling and lifting operations in various industrial applications.

iii) IS 16773: 2018 Round steel short link chains for lifting purposes - Fine tolerance hoist chains for hand operated chain hoists - Grade th

This standard specifies the requirements for fine tolerance hoist chains of Grade TH used in hand-operated chain hoists. The guidelines given in IS 16773: 2018 cover material properties, dimensional accuracy, mechanical strength, and testing procedures. It ensures that the chains are capable of handling specified loads safely and reliably. The standard also includes provisions for inspection and quality control. It assists manufacturers and users in ensuring consistent performance and safety in lifting operations.

iv) IS 16772: 2018 Round steel short link chains for lifting purposes - Fine tolerance hoist chains for hand operated chain hoists - Grade vh

This standard specifies requirements for fine tolerance hoist chains of Grade VH used in lifting applications. IS 16772: 2018 includes provisions related to design, materials, mechanical properties, and testing requirements. It ensures that chains meet the required safety and performance criteria under operational conditions. The standard supports uniformity and reliability in the manufacture and use of lifting chains. It assists in maintaining safe working conditions in industrial environments.

v) IS 6547: 2015 Electric chain hoists - Specification (First Revision)

This standard specifies the requirements for electric chain hoists used in lifting operations. The provisions of IS 6547: 2015 cover design, construction, electrical and mechanical components, performance, and safety requirements. It includes guidelines for load capacity, braking systems, control mechanisms, and testing procedures. The standard ensures reliable and safe operation of hoists under various working conditions. It assists manufacturers and users in achieving efficient, durable, and safe lifting performance.

vi) IS/ISO 3076: 2012 Round steel short link chains for general lifting purposes - Medium tolerance sling chains for chain slings - Grade 8 (First Revision)

This standard specifies the requirements for round steel short link chains of Grade 8 used as medium tolerance sling chains for general lifting purposes. The provisions of IS/ISO 3076: 2012 cover material specifications, heat treatment, dimensional tolerances, and mechanical properties to ensure adequate strength and durability. It includes requirements for proof testing, breaking force, elongation, and inspection to verify performance under load conditions. The standard also provides guidelines for marking and certification to ensure traceability and compliance. It assists manufacturers, inspectors, and users in ensuring safe, reliable, and efficient performance of chain slings in various lifting operations.

vii) IS 15191: 2002 Forged steel components for use with grade T (8) chain and chain slings – Specification

This standard specifies the requirements for forged steel components used with Grade T (8) chains and chain slings in lifting applications. The provisions of IS 15191 : 2002 cover material quality, manufacturing processes, mechanical properties, and testing requirements to ensure strength and reliability. It includes guidelines for dimensional accuracy, load-bearing capacity, and safety factors. The standard assists manufacturers and users in ensuring safe and efficient performance of lifting components under various operating conditions.

viii) IS/ISO 3077: 2001 Short Link Chain For Lifting Purposes Grade T (Types T, Oat And Dt), Fine-Tolerance Hoist Chain

This standard specifies requirements for fine tolerance hoist chains of Grade T used in lifting and hoisting operations. The provisions of IS/ISO 3077: 2001 include detailed specifications for material quality, heat treatment, dimensions, and mechanical properties such as tensile strength and elongation. It also provides guidelines for testing and inspection to ensure performance under dynamic loading conditions. The standard ensures high precision and uniformity required for smooth operation in hoisting equipment. It supports safe and efficient lifting operations in industrial environments.

Shackles

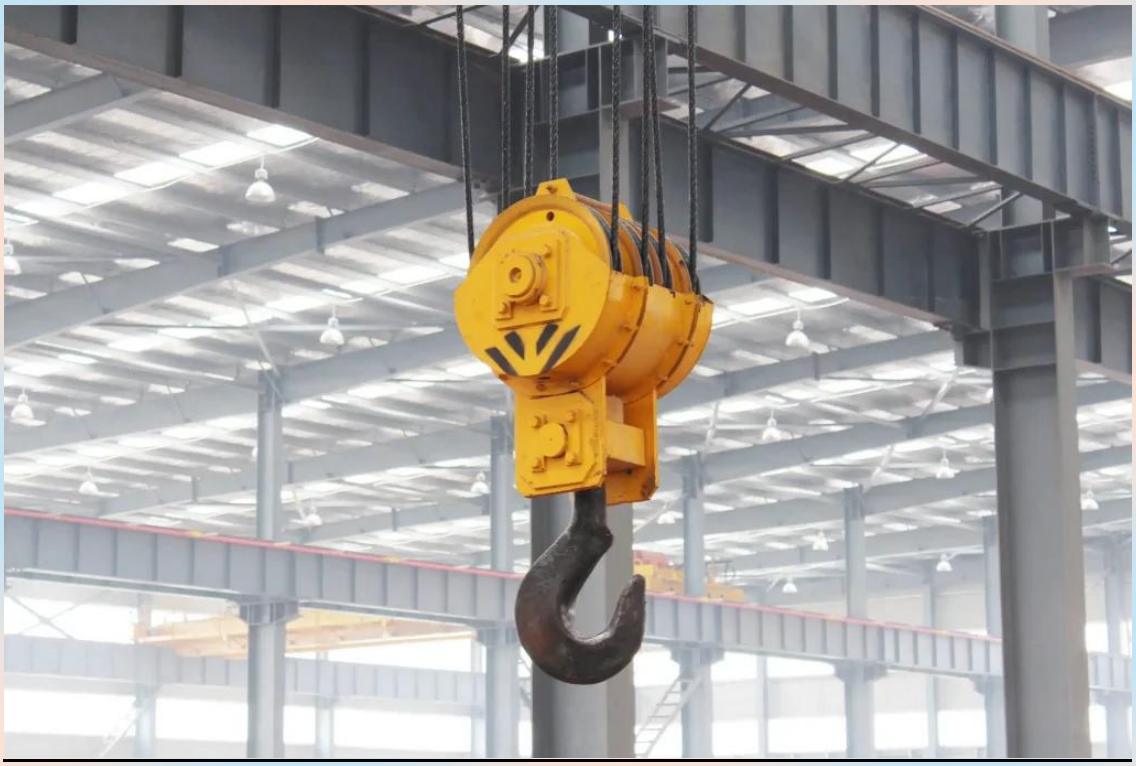
i) IS 19404:2025 Forged Shackles For General Lifting Purposes Dee Shackles And Bow Shackles First Revision

This standard specifies the requirements for forged shackles, including dee shackles and bow shackles, used in general lifting and material handling operations. The provisions of IS 19404: 2025 cover material selection, design, dimensions, and mechanical properties to ensure adequate strength and reliability under working loads. It includes requirements for manufacturing processes, heat treatment, proof testing, inspection, and marking to ensure quality and traceability. The standard also defines safety factors and acceptance criteria for safe use. It assists manufacturers, inspectors, and users in ensuring safe, durable, and efficient performance of shackles in various lifting applications.

ii) IS/ISO 2415: 2004 Forged shackles for general lifting purposes - Dee shackles and bow shackles

This standard specifies the requirements for forged shackles, including dee shackles and bow shackles, used in general lifting applications. The provisions of IS/ISO 2415: 2004 cover material quality, design, dimensions, and mechanical properties to ensure adequate strength and reliability under load. It includes requirements for manufacturing processes, proof testing, inspection, and marking to verify performance and ensure traceability. The standard also defines safety factors and acceptance criteria for safe usage. It assists manufacturers, inspectors, and users in ensuring safe, durable, and efficient performance of shackles in various lifting and material handling operations.

Hooks



i) IS 4164:2025 Lifting C Hooks With Eye Capacity Up To 25 Tonnes Specification

This standard specifies the requirements for lifting C-hooks with eye used for handling loads up to 25 tonnes in material handling operations. The provisions of IS 4164: 2025 cover design, material selection, dimensions, and mechanical properties to ensure adequate strength and safe load carrying capacity. It includes requirements for manufacturing processes, stress considerations, and safety factors to prevent failure during lifting. The standard also outlines procedures for proof testing, inspection, marking, and certification to ensure compliance and traceability. It assists manufacturers, inspectors, and users in ensuring safe, reliable, and efficient handling of loads using C-hooks in industrial applications.

ii) IS 15560: 2005 Point hooks with shank up to 160 tonne specification

This standard specifies the requirements for point hooks with shank having capacities up to 160 tonnes used in heavy lifting operations. The provisions of IS 15560: 2005 cover material selection, design, dimensions, and mechanical properties to ensure high strength and reliability under heavy loads. It includes requirements for manufacturing processes, heat treatment, stress considerations, and appropriate safety factors to prevent failure. The standard also outlines procedures for proof testing, inspection, marking, and certification to ensure performance and traceability. It assists manufacturers, inspectors, and users in ensuring safe, durable, and efficient use of point hooks in demanding lifting applications.

ii) IS 3822: 2002 Eye hooks for use with chains – Specification (Second Revision)

This standard specifies the requirements for eye hooks used with chains in lifting and material handling operations. The provisions of IS 3822: 2002 cover material selection, design, dimensions, and mechanical properties to ensure adequate strength and reliability under working loads. It includes requirements for manufacturing processes, heat treatment, proof testing, and inspection to verify performance and safety. The standard also outlines marking and certification requirements for traceability and compliance. It assists manufacturers, inspectors, and users in ensuring safe, durable, and efficient performance of eye hooks in various lifting applications.