IS 3832 (2005): Hand-Operated Chain Pulley Blocks [MED 14: Cranes, Lifting Chains and Related Equipment]

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भारतीय मानक

हस्तचालित चैन पुली ब्लॉक — विशिष्टि

(तीसरा पुनरीक्षण)

Indian Standard

HAND-OPERATED CHAIN PULLEY BLOCK — SPECIFICATION

(Third Revision)

ICS 53.020.30

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 2005

Price Group 6

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cranes, Lifting Chains and Its Related Equipment Sectional Committee had been approved by the Mechanical Engineering Division Council.

Hand-operated chain pulley blocks are used extensively for material handling during construction, erection and maintenance of industrial plants.

This standard was revised in 1971 and in 1986. In the second revision, the minimum requirements of onload chains were upgraded to Grade 40. Further a design with factor of safety of 4 was added. In this revision, additions have been made to the following:

a) Introduction of a classification system broadly based on ISO 4301-1 : 1986 'Cranes and lifting appliances — Classification — Part 1 : General', and

b) Introduction of number of light load test and endurance type test.

Assistance also has been taken from BS 3243 : 1990 'Hand-operated chain blocks'.

This standard covers mechanical aspects related to design, manufacture, erection and testing of the jib cranes required for the shop floor and general workshop applications like pillar, wall bracket jib cranes including moving cantilever wall cranes.

This standard has been prepared based on indigenous manufacturers data/practices prevalent in the field in India.

The composition of the Committee responsible for formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirements of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HAND-OPERATED CHAIN PULLEY BLOCK — SPECIFICATION

(Third Revision)

1 SCOPE

This standard lays down the general requirements and testing of the hand-operated chain pulley blocks, worm or spur gear type.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
210 : 1993	Grey iron castings — Specification (*fourth revision*)
305 : 1981	Specification for aluminium bronze ingots and castings (*second revision*)
617 : 1994	Aluminium and aluminium alloy ingots and castings for general engineering purposes (*third revision*)
1030 : 1988	Carbon steel castings for general engineering purposes (*fifth revision*)
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forgings (*first revision*)
2062 : 1999	Steel for general structural purposes — Specification (*fifth revision*)
2429 (Part 1) : 1987	Specification for round steel short link chains (Electric butt welded), grade L(3): Part 1 Non-calibrated load chain for lifting purposes (*third revision*)
3109 (Part 2) : 1982	Specification for short link chain, grade M (4): Part 2 calibrated load chain for pulley blocks and other lifting appliances (*second revision*)
4215 : 1983	Specification for ring type needle bearings (*first revision*)
4367 : 1991	Alloy steel forgings for general industrial use (*first revision*)
5669 : 1987	General plan of boundary dimensions for radial rolling bearings (*first revision*)
6216 : 1982	Short link chain, grade T (8) calibrated for pulley block and other lifting appliances (*first revision*)
6547 : 1972	Specification for electric chain hoists
7460 : 1988	Tolerances for tapered roller bearings (*first revision*)
7461	General plan of boundary dimensions for tapered roller bearings:
(Part 1) : 1993	Single row bearings (*second revision*)
(Part 2) : 1992	Double row bearings (*second revision*)
(Part 3) : 1992	Flanged cups (*second revision*)
8500 : 1991	Structural steel — Micro alloyed (medium and high strength qualities) — Specification (*first revision*)
14329 : 1995	Malleable iron castings
15560 : 2005	Point hook with shank up to 160 Tonnes — Specification

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply (*see* Fig. 1).

3.1 Hand-Operated Chain Pulley Blocks — A block reeved with a load chain and operated by a hand chain so as to give a mechanical advantage.

3.2 Working Load Limit — The maximum mass which the block shall be designed to raise, lower or suspend in general service.

3.3 Safe Working Load — The maximum mass, which the block shall raise, lower or suspend in a particular service condition. It shall not be greater than the working load limit but it may be less.

3.4 Range of Lifting — The distance between the upper and lower limits of travel of the load hook.

3.5 Velocity Ratio — The ratio between the velocities of hand chain and the load. It is equal to the number

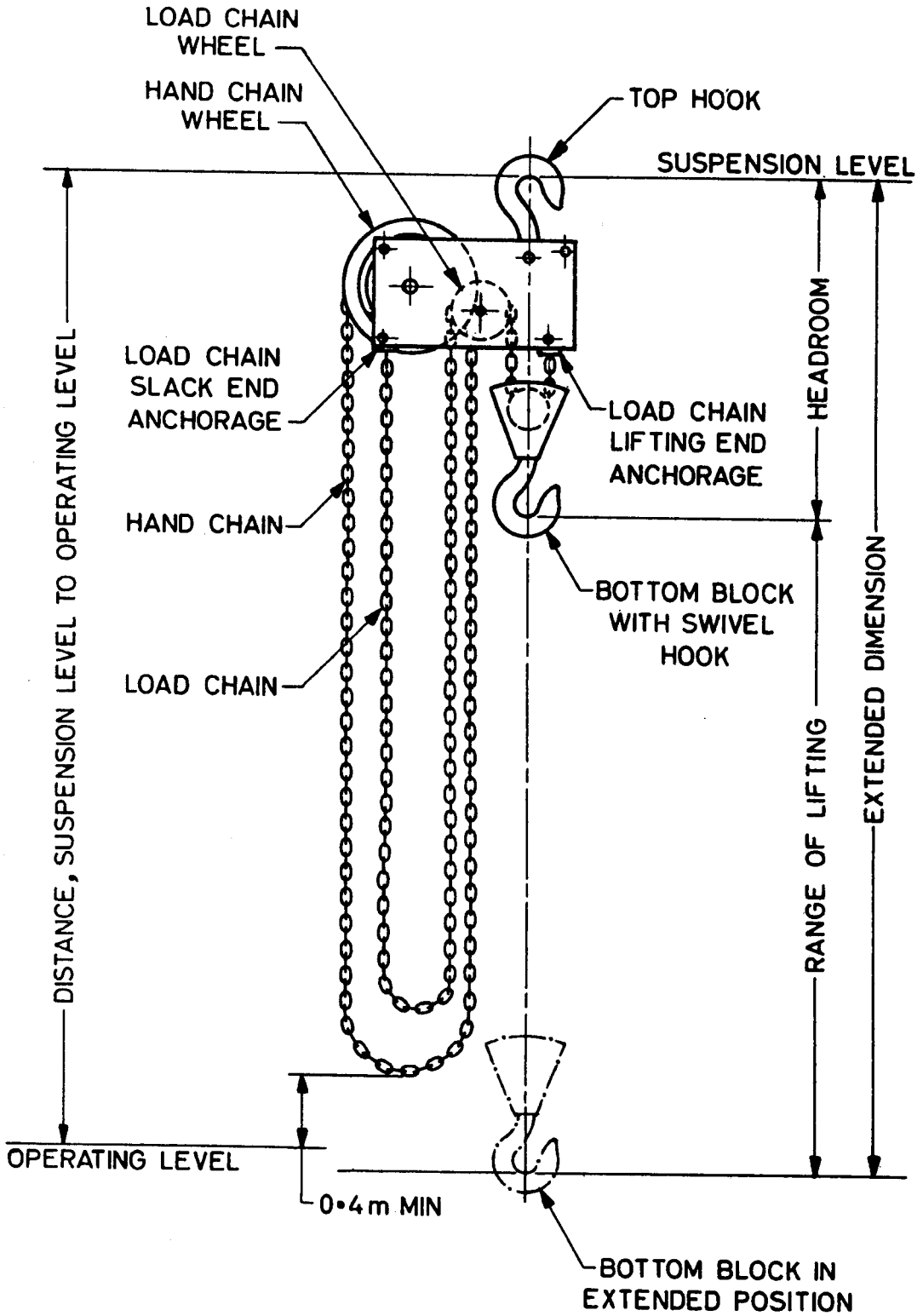

FIG. 1 CHAIN PULLEY BLOCK

of metres the hand chain has to be moved to raise or lower the hook through a distance of one meter.

3.6 Factor of Safety — The ratio between the ultimate strength of the pulley block as a unit and working load limit where the ultimate strength of the pulley block is the minimum load on the load hook under which the load chain or any other component of the pulley block gives away.

3.7 Chain Pull or Operating Effort — Average effort, in Newton, exerted by the operator on the hand chain to lift the load to working load limit and keep it in motion.

3.8 Suspension Level — The level of the suspended hook bed in the case of a block suspended from a hook. In the case of a block combined with a trolley, the level of the surface upon which the trolley runs.

3.9 Head Room — The distance between suspension level and the saddle of the load hook in its highest position, without causing any undue tension on load chain lifting anchorage.

3.10 Extended Dimension — The distance between suspension level and the bottom hook saddle, when the bottom hook is in the lowest operating position, without causing any undue tension on load chain slack end anchorage. It equals the sum of the headroom and range of lifting.

3.11 Operating Level — The level on which the operator stands.

3.12 Competent Person — The person who is approved and declared as such under the relevant statutory provisions.

4 DESIGN AND CLASSIFICATION

4.1 Design

4.1.1 The blocks shall be so designed that all components shall withstand without failure, an application to the block of a load equal to at least four times the working load limit. It shall take into account of the state of loading and expected life (*see* Annex A) and shall be based on the information provided by the purchaser in accordance with Annex B.

4.2 Classification

4.2.1 Hoists shall be classified in four classes with respect to the frequency of application and variation of magnitude of the load (*see* **4.2.3**) and the effect of impact.

4.2.2 The materials used in the construction of hoists shall be properly selected for the stresses encountered when the equipment is used in accordance with the manufacturers' recommendations. The design of the component parts of the hoist shall include due allowance for the effects of the duty which the mechanism will perform in service and shall be in accordance with the requirements of **4.2.3** and **4.2.4**.

4.2.3 *Design on Strength Basis*

In the design of a component on the basis of ultimate strength, the value of stress factor multiplied by the duty factor for the appropriate hoist class; where basic stress factor shall be not less than 5 and the duty factor shall be as given in Table 1 for the appropriate hoist Class 1 and Class 2.

4.2.4 *Design on Life Basis*

Components designed on the basis of life shall have a rated life of not less than 20 years of 250 days per year for Class 1, 300 days per year for Class 2, and 333 days per year for Class 3 and Class 4.

4.2.4.1 The running hours per day or the life, in hours used for the purpose of the design of the components shall be the value specified value specified in Table 1 for the appropriate class.

4.3 Selection of Safe Working Load

The safe working load shall be selected in accordance

Table 1 Duty Factor and Life of Mechanism

(*Clause* 4.2.3)

Sl No.	Mechanism Class	Duty Factor		Average Life	
		Strength	Wear	Running h/ day	Total Life h
(1)	(2)	(3)	(4)	(5)	(6)
i)	1	1.0	0.4	0.5	Over 2 500
ii)	2	1.0	0.5	1.5	Over 9 000
iii)	3	1.2	0.6	3	Over 20 000
iv)	4	1.4	0.7	Over 6	Over 40 000

with Table 2 using the classification (*see* **4.2**).

Table 2 Safe Working Load of Chain Blocks

(*Clause* 4.3)

Sl No.	Classification	Safe Working Load % of Working Load Limit
(1)	(2)	(3)
i)	M1	100
ii)	M2	80
iii)	M3	63
iv)	M4	50

5 CONSTRUCTION

5.1 Frame

The frame of the block shall be designed for proper strength and it shall maintain alignment under all expected conditions of service.

5.2 Gears

The gears shall be designed for proper strength and for surface durability such as to afford efficient operation throughout the period guaranteed by the manufacturers. In case of enclosed gearing, means shall be provided for ample lubrication.

5.3 Load Brakes

All pulley blocks which are not inherently self-sustaining when the pull of the hand chain is removed, shall be provided with an automatic mechanical load brake which will prevent self-lowering of the load and arrest and sustain load in all working positions. The load brake shall also allow smooth lowering of the load without serious overheating which may impair efficient working of the block.

5.4 Pawls

5.4.1 Pawls shall be of sufficient strength to arrest the full load from lowering due to gravity.

5.4.2 The relative width and positioning of the ratchet wheel and the pawl shall be such as shall ensure full engagement irrespective of wear of the friction faces.

5.4.3 The pawl and the ratchet shall be made of steel, hardened and tempered or given an equivalent treatment to provide satisfactory degree of wear resistance together with toughness. The hardness of the pawl tip shall not be less than 40 HRC and that of ratchet not less than 30 HRC.

5.4.4 The pawl shall engage with the ratchet wheel either by means of a spring other than a tension spring or by some other equally effective means.

5.4.5 The pawl shall be so positioned that it engages the ratchet wheel under gravity, should its operating mechanism fail.

5.4.6 Adequate arrangements shall be made to ensure the pawl does not seize on the pawl pin.

5.5 Bearings

Bearings used shall be of plain or rolling type.

5.5.1 Roller bearings shall conform to IS 4215 or IS 5669 or IS 7460 or IS 7461 (Part 1) or IS 7461 (Part 2) or IS 7461 (Part 3).

5.5.2 *Bronze or Cast Iron Plain Bearings*

When plain bearings are used, their maximum bearing pressure shall not exceed the following values unless manufacturer can produce evidence satisfactory to those concerned that a higher pressure is permissible:

	In Bronze Bearings	*In Cast Iron Bearings*
	MN/m²	MN/m²
Steel shaft – ground	17	14
Steel shaft – not ground	14	10

NOTE — 10 MN/m² = 1 kgf/mm².

5.5.3 *Plain Bearings in Materials Other than Cast Iron or Bronze*

Higher bearing pressures than those specified in **5.5.2** may be used by the manufacturer, if evidence is produced that higher pressure may be used.

5.6 Lubrication

The block shall be provided with adequate facilities for lubrication unless materials with inherent lubricating properties are used.

5.7 Suspension Fittings

5.7.1 *Hook*

Point hooks with shank up to 160 t shall conform to IS 15560. It shall be forged from steel and the shank shall be either:

a) provided with nut or screwed collar of out side diameter of atleast 1.5 times the diameter of the shank engaged by the nut or screwed collar on the load side shall be equal to atleast 0.66 times the diameter of the shank before being interrupted by drilling for pins or other fixings, or

b) so shaped from the solid as to afford the same security as though a nut were fitted as in **5.7.1** (a).

The hooks shall be so designed that it shall be free to swivel in the loaded conditions without twisting the load chain. Swivel hooks shall be capable of being

lubricated both initially on installation and during servicing. Where the means of attachment of a shank hook is dependent on a split collar mating with an enlarged head on the shank, the means of retention shall be secure. However, it is in agreement between the manufacturer and purchaser. There shall not be any welding in the hooks.

NOTE — Safety latches are recommended but attention is drawn to the statutory regulations covering lifting operations. In some cases those requirements affect hooks, demanding safety catches, mousing or use of 'C' hooks.

5.7.1.1 *Top hooks*

Where provision is made for the top hook to swivel, it shall remain positionally stable under load.

5.7.1.2 *Bottom hooks*

Bottom hooks shall be free to rotate under load so as to prevent twisting of the load chain. If threaded components are used, they shall be sealed against ingress of moisture. Welding shall not be used as a method of retention or sealing.

5.7.2 *Other Fittings*

Suspension fittings other than hooks shall be of sufficient strength to affect a static factor of safety of not less than four unless otherwise required by the relevant Indian Standards.

5.7.3 All suspension fittings shall be readily detachable for inspection of stressed parts, such as shanks.

5.8 Load Chain

5.8.1 *Grade*

The minimum requirements of a load chain pulley block shall not be less than that of Grade T (8) chain conforming to IS 3109 (Part 2).

NOTE — If chain of grade 100 is used, the percentage elongation shall not be less than 10.

5.8.2 *Chain Engagement*

Means shall be provided to guide the load onto the load chain wheel.

5.8.3 *Length of Chain*

Total length of the load chain shall exceed the minimum length required to give the prescribed range of lift by not less than three links per fall to ensure that the slack and ancncourage is not loaded.

5.8.4 *Load Chain Wheel*

The load chain wheel shall be made of suitable material for use with load chain employed and be of adequate strength and shall be suitable designed to ensure effective operation of the chain and should be properly secured with shaft, preferably with splines.

5.8.5 *Guide*

Means shall be provided to ensure effeetive guidance of the load chain into chain wheel pockets.

5.8.6 *Stripper*

A stripper shall be provided to ensure effective disengagement of the load chain wheel.

5.8.7 *Idler Wheel*

The chain pulley blocks shall be provided with idler wheels so shaped as to avoid the twisting of the chain when passing around.

5.8.7.1 The pitch diameter of the idler wheels shall be such that the bending action of the link is avoided.

5.9 Anchorages

The load chain anchorages, associated fittings and the frame work at the slack end shall be at least equal in strength to 2.5 times the maximum tension in the load chain when the working load limit is being lifted.

5.10 Hand Chain

5.10.1 *Grade*

The material, welding and finish shall be at least equal to that of grade 30 chain as per IS 2429. Hand chain shall be untested, pitched and polished condition. It should have proper seating in hand chain wheel and should not over ride.

5.10.2 *Link Dimensions*

The following dimensions are recommended:

Nominal Size mm	*Pitch* mm	*Outside Width* mm
5	22.5 ± 0.5	17 ± 0.5
6	22.5 ± 0.5	20 ± 0.5

5.10.3 *Length of Chain*

The length of the hand chain shall be such that the lowest point of the suspended loop shall hang at least 400 mm above the operating level.

5.10.4 The hand chain shall be joined without twist. The method of joining shall ensure that there are no sharp or projecting edges, causing any harm during its used.

5.10.5 *Hand Chain Wheel*

Hand chain wheels shall be provided with flanges and designed to ensure effective operation with the hand chain.

5.10.6 *Hand Chain Guide*

The hand chain guide shall be so designed that the

chain will not come out of the hand chain wheel during use nor get caught between guide and hand chain wheel.

5.11 When the chain pulley block is mounted on a trolley with the travel movement, the trolley frame shall be provided with adequately designed anti-tilt/ anti-drop plates which will prevent falling of the load in the event of bending of side plates or breakage of wheel or pin, etc.

6 MATERIALS

6.1 The material shall be so selected as to meet the ultimate properties keeping the factor of safety in mind. Some of the recommended materials for different components of pulley block are given below:

Component	*Conforming to IS No.*
Frame	IS 2062 IS 8500
Chain wheel	IS 210 IS 305 IS 617 IS 1030 IS 14329
Gears	IS 1875 IS 4367

7 RATING

The hand-operated chain pulley blocks shall be rated according to the working load limit which in case of a block with four or fewer falls shall be determined from the safe working load of the load chain.

Where the falls exceed four, or angles are introduced into the chain run, a chain stronger than that for the corresponding four-fold block is required to provide for the additional load caused by friction.

8 EFFORT AND VELOCITY RATIO

8.1 The manufacturer shall declare the operating effort on the hand chain required to raise the safe working load, and also the velocity ratio of the block (*see* Annex C).

8.1.1 The operating effort shall be equivalent to the minimum weight suspended on the hand chain which, given a start, continues to travel downwards and to raise the full safe working load on the hook.

9 TESTS

9.1 Design Test

At the purchaser's option and expense a sample block or blocks shall be selected by the representative of the purchaser and shall be subjected by a tensile testing machine, to at least four times the working load limit capable to withstand for at least 5 min, without breakage of material, partial or complete or such distortion as could result in the release of the load. Following this test all parts shall be defaced to make them unusable.

9.2 Operational Proof Test

Each chain pulley block shall be subjected by the manufacturer to a proof load of 1.5 times the working load limit through a length of lift which will ensure that every part of the block mechanism and each tooth of the gears come under load. When the test is carried out by operating the hand chain wheel by power, the load shall also be lifted and lowered by hand through a distance sufficient to prove the satisfactory working of the mechanism of the block.

9.2.1 *Examination*

After operational proof test, the block shall be examined by a competent person. It complies with this standard only if it is found free from deformation, cracks, flaws or other defects.

9.3 Light Load Test

9.3.1 *Test Procedure*

Each block shall be loaded with a test weight of between 25 percent and 50 percent of working load limit (WLL) which shall be raised and lowered through a height of between 250 mm and 500 mm.

9.3.2 *Acceptance Criteria*

When the hand chain is released at any point during raising and lowering, the brake shall hold the weight.

NOTE — Blocks which are fitted with seals may appear to hold the load by the brake, when in fact it is being held by seal friction only. This condition does not meet the criteria of acceptance.

9.4 Endurance Type Test

9.4.1 *Test Procedure*

A representative sample block shall be loaded with the WLL which shall be raised and lowered so that the mechanism is in motion for 100 h at an equivalent minimum hand chain speed 20 m/min in 500 mm to 600 mm steps.

9.4.2 *Acceptance Criteria*

There shall be no breakage of material, partial or complete, nor such distortion as could result in the release of the load.

NOTES

1 For the purpose of this test, the block may be reeved with a single fall provided the tension in the load chain equals the actual tension imposed when the fully reeved block is raising the WLL.

2 This is prototype test and record to be maintained.

10 INSPECTION, CERTIFICATE OF TEST AND EXAMINATION

10.1 Inspection

The representative of the purchaser shall have access to the works of the manufacturer at all reasonable times for the purpose of witnessing the specified test and inspecting the test equipment and methods of examination.

10.2 Certificate of Test and Examination

A certificate of test and examination shall be issued with every consignment of blocks, giving the following information for each one:

a) Safe working load,

b) Distinguishing mark,

c) Description,

d) Range of lift,

e) Load chain size and grade,

f) Number tested, and

g) Operational proof load applied.

11 MARKING

11.1 After the chain block passes the proof test, it shall be permanently and legibly stamped with the following information:

a) Distinguishing mark,

b) Safe working load,

c) Grade of load chain,

d) Range of lift, and

e) Manufacturer's name, initials or trade-mark.

Safe working load shall be marked in such a way that it is clearly legible from operating level.

11.2 BIS Certification Marking

The chain pulley blocks may also be marked with the Standard Mark.

11.2.1 The use of the standard mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PRESERVATIVE MAINTENANCE

The hand-operated chain pulley blocks shall be painted on non-working surfaces and the working surfaces shall be covered with grease.

ANNEX A

(*Clause* 4.1.1)

RECOMMENDATIONS FOR SAFE USE AND MAINTENANCE OF HAND-OPERATED CHAIN PULLEY BLOCKS

A-1 Never lift a load in excess of the safe working load marked on the block. The block has been proof-loaded to one-and-a-half times the safe working load, but this has been done under carefully controlled conditions. Use of the block at any load greater than the safe working load may result in damage (*see* Fig. 2).

A-2 Never use a load chain as a sling, that is, by back hooking.

A-3 Before use, examine the load chain to ensure that there is no twist. In the case of a block lifting on two falls, twist can arise from the bottom block being accidentally turned over.

A-4 Keep load chains well lubricated along their whole length and especially at the contact points between the links. In special circumstances, chain may be used dry, but their life will be considerably reduced.

A-5 If the load chain jumps, does not work smoothly or marks in use, it is probably out of pitch and should be replaced.

A-6 Do not allow, dirt and hard grease together in the pockets of the load or hand chain wheels.

A-6.1 Do not store, or leave the pulley blocks lying on the ground where they can collect dirt.

A-7 Chain pulley blocks are designed for lifting loads vertically and should not be used for pulling horizontally or at an angle.

A-8 Never lift with the point of the hook.

A-9 Never run the load chain out too far. When the block is run out beyond the extended dimensions, an excessive and dangerous load is imposed at the load chain slack end anchorage.

A-10 All pulley blocks shall be registered and, at periodic intervals, should be thoroughly cleaned, inspected and lubricated.

A-11 Care shall be taken when replacing the chains that the same grade of chain is fitted. Blocks shall be marked with the grade of chain.

A-12 Check the suspension fixture for top hook for adequate strength to support the load being lifted and the weight of the chain pulley block.

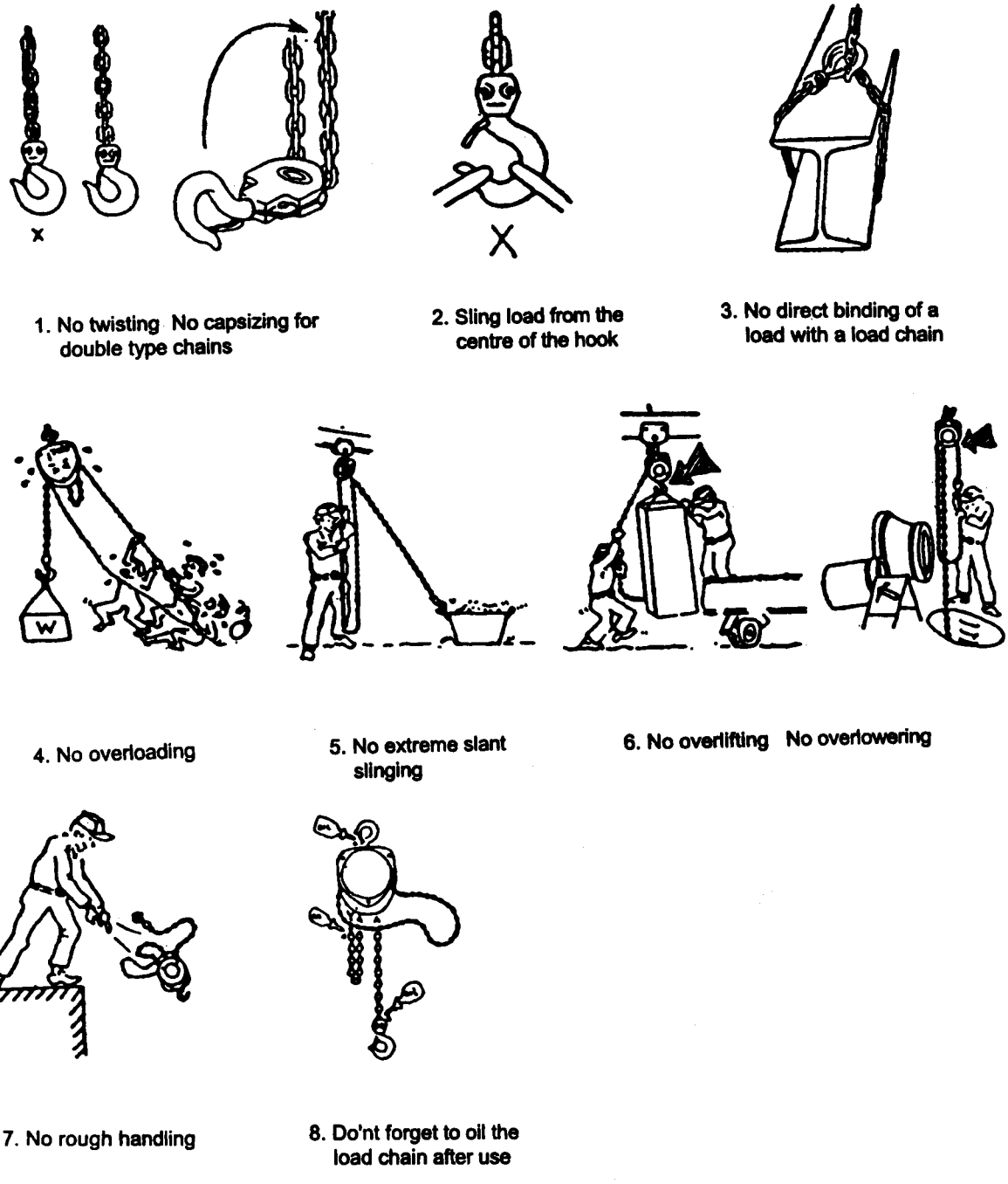

FIG. 2 ILLUSTRATIONS FOR THE SAFE USE OF HAND-OPERATED CHAIN PULLEY BLOCK

ANNEX B

(*Clause* 4.1.1)

INFORMATION TO BE SUPPLIED BY THE PURCHASER WITH THE ENQUIRY OR ORDER

B-1 Particulars of hand-operated chain pulley blocks:

a) Capacity or load to be lifted, in tonnes;

b) Conditions of service;

c) Life (above operating level and below operating level, in metres);

d) Type of suspension (hook, lug push trolley or geared trolley);

e) Headroom (maximum headroom permissible in metres);

f) Distance between suspension level and floor level/operating level;

g) Spur gear or worm gear type;

h) Whether the design test is required; and

j) Advice about lubrication shall be included in the servicing instructions.

ANNEX C

(*Clause* 8.1)

EFFORT RELATED TO RATING

C-1 Table 3 gives the opening efforts for different classes of pulley blocks with rating up to 6.0 tonnes. It represents average good practice. It is intended as a guide in choosing the correct type of block to suit the conditions of work and type of duty.

C-2 For blocks rated above 6 t, operating effort required is a matter for arrangement between the manufacturer and the purchaser, in the light of the relevant figures declared as required in **8**.

C-3 The values given in Table 3 are not intended as rigid categories, but as an indication to be used imaginatively and flexibly. For example a worm gear block may be designed to lift 1.6 t with an operating effort of 500 N, and would therefore be a class 2 block. If this type of block is fitted to a frequently used light crane, it should be down rated to a safe working load of 1 t to make it a one man machine. This, of course, is at the customer's discretion. On the other hand, the customer may require an occasionally used maintenance crane in a power house where 500 N operating effort will be acceptable.

Arbitrary figures are quoted to classify duty in relation to the number of hours in usage, to permit a rough relative assessment of operating costs and initial costs.

For intermediate ratings the operating effort for the next higher rating should be expected.

Table 3 Effort Relating to Rating

(*Clauses* C-1 *and* C-3)

Sl No.	Class	Work Description	Rating, t								
			0.5	1	(1.5)	2	(2.5)	3	(4)	5	(6)
			Operating Efforts, N								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	1	Light duty general purpose erection tackle, maintenance tackle, maintenance cranes, etc, 125 h/year	310	410	430	460	510	560	610	660	710
ii)	2	Medium duty cranes, runways lifting parts into position for machining duty — Partial shift more than 450 h/year	260	330	340	460	430	490	550	610	660
iii)	3	Heavy duty cranes, runways lifting parts into position for manufacturing duty — Full shift more than 999 h/year	210	310	340	360	410	460	510	560	610
iv)	4	Very heavy duty cranes, lifting parts into position for manufacturing duty — 2 or 3 shift more than 1 998 h/year	190	310	330	350	380	510	540	560	580

NOTES

1 1 Tonne = 1 000 kg = 10^4 N ; 1 kg = 10 N.

2 Roughly a man can pull 250 N continuously and 350 N for a short period.

3 Capacities shown in brackets are non-preferred ratings.

ANNEX D

(Foreword)

COMMITTEE COMPOSITION

Cranes, Lifting Chains and Its Related Equipment Sectional Committee, ME 14

Organization	*Representative(s)*
Bharat Heavy Electricals Ltd, Tiruchirappalli	SHRI K. MANICKAM (***Chairman***)
Armsel MHE Pvt Ltd, Bangalore	SHRI A. C. HERI
	SHRI N. VASUDEVA (*Alternate*)
Anupam Ltd, Anand	SHRI K. K. PATHAK
Bharat Heavy Electricals Ltd, Hyderabad	SHRI GIRISH SHRIVASTAVA
	SHRI H. BHARANI (*Alternate*)
Central Building Research Institute, Roorkee	SHRI R. L. GUPTA
	SHRI D. K. GAUTAM (*Alternate*)
Directorate General Factory Advice Service & Labour Institute, Mumbai	SHRI D. K. DAS
	SHRI K. C. S. RAO (*Alternate*)
Furnance and Foundry Equipment Co, Mumbai	SHRI SHYAM M. GURNANI
Hercules Hoists Ltd, Mumbai	SHRI P. B. KUCHERIA
Indian Chain Pvt Ltd, Kolkata	SHRI P. CHITLANGIA
	SHRI LALITMOHAN (*Alternate*)
Indian Link Chain Manufacturers Ltd, Mumbai	SHRI P. K. NEVATIA
Jessop & Co Ltd, Kolkata	SHRI BIMAL CHANDRAPAL
	SHRI TAPAN DATTA (*Alternate*)
Larsen & Toubro Limited, Kolkata	SHRI M. S. CHAKRABORTHY
	SHRI L. N. MISHRA (*Alternate*)
Mega Drives Pvt Ltd, Thane	SHRI D. MAJUMDAR
	SHRI N. B. BHUJLE (*Alternate*)
Metallurgical & Engg Consultants (I) Ltd, Ranchi	SHRI T. K. ROY
	SHRI H. S. SINGH (*Alternate*)
M. N. Dastur & Co Ltd, Kolkata	SHRI D. GHOSH
	SHRI G. C. BANERJEE (*Alternate*)
Ministry of Defence (DGI), New Delhi	SHRI K. PARTHIBAN
	SHRI RAJINDER SINGH (*Alternate*)
Ministry of Surface Transport, New Delhi	SHRI T. K. DATTA
Mukand Ltd, Thane	SHRI D. CHAKRABORTHY
	SHRI D. S. SENTHILVEL (*Alternate*)
National Thermal Power Corporation Ltd, New Delhi	SHRI B. K. BHATTACHARYA
	SHRI R. S. YADAV (*Alternate*)
Reva Engg Industrial (P) Ltd, New Delhi	SHRI BALRAJ GOEL
	SHRI R. K. GANDHI (*Alternate*)
Tata Engg & Locomotive Co Ltd, Pune	SHRI R. K. JOSHI
	SHRI S. MISHRA (*Alternate*)
Tata Iron and Steel Company Limited, Jamshedpur	SHRI D. P. RATHORE
	SHRI J. P. SINGH (*Alternate*)
Unicon Technology International Pvt Ltd, New Delhi	SHRI R. S. NALWA
	SHRI MANISH NALWA (*Alternate*)
WMI Cranes Ltd, Mumbai	SHRI S. M. MALANI
BIS Directorate General	SHRI A. S. BASU, Scientist F & Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary
SHRI S. B. ROY
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TO
IS 3832 : 2005 HAND-OPERATED CHAIN PULLEY BLOCK — SPECIFICATION

(Third Revision)

(*Page* 1, *clause* **2**)— Delete IS 3109 (Part 2) : 1982 along with its title.

(*Page* 3, *clause* **4.2.3**, *last line*) — Delete '1 and Class 2'.

(*Page* 3, *clause* **4.2.4.1**, *third line*) — Delete one of the repeated words 'value specified'.

(*Page* 5, *clause* **5.8.1**, *third line*) — Substitute 'IS 6216 : 1982' *for* 'IS 3109 (Part 2)'.

(*Page* 5, *clause* **5.10.1**, *second line*) — Substitute 'grade L (3) chain as per IS 2429 (Part 1)' *for* 'grade 30 chain as per IS 2429'.

[*Page* 9, *Annex* B, *clause* **B-1**(c)] — Substitute 'Lift' *for* 'Life'.

(ME 14)

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