



GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
DIRECTORATE GENERAL OF MINES SAFETY
DHANBAD – 826001, JHARKHAND

No. DGMS/ S&T/Tech. Cir. (Approval) No. 2

Dhanbad , the 3rd June 2010

To:

The Owner, Agent, Manager of All Mines & The Manufacturers

Subject: Standard Components and Properties of Rigid Steel Props, Chocks & Cogs to be used in Mines

Steel Supports such as rigid steel cogs, chocks and props are being widely used in the mines. In making of such steel supports, various types of circular or square section hollow steel tubes, angles, frames etc. are being used. In order to ensure the desired strength, stability and durability of such supports, a committee was constituted comprising of mine management, trade union, CIMFR and officials from DGMS to look into this issue in depth. On the basis of such study conducted by the committee, a technical circular vide DGMS (Tech)).S&T/Cir/No.1 dated 5th January 2007 was issued from this Directorate. The Circular prescribes the minimum test standard for such supports before using in mines.

After due technical considerations and to check the quality of support being used in the mines, the steel supports including roof bolts were brought under the purview of approval vide Gazette Notification No. GSR 160 dated 14th August, 2008, and a circular in this regard was also issued vide this Directorate's issue No. DGMS (Tech) (S&T)/Circular No. 3/703 dated 14.08.2008.

The Cogs, Chocks and Steel Props manufactured by various companies have also been approved from this Directorate. The Data collected during the testing of such supports have been analysed. Several meetings and discussions were held with scientists from Central Institute of Mining & Fuel Research (CIMFR) and Professors from Indian School of Mines, Dhanbad,

During the period of testing, approval and field trials of such supports, various suggestions, recommendations and advices were received from the scientists from Research &

Development Centre for Iron & Steel (RDCIS), Ranchi & CIMFR, Dhanbad, CMPDIL, Ranchi, ISM, Dhanbad, and CIL, Kolkata. The feedbacks received from such organisations have been considered and the standard and parameters of the steel chocks, cogs and Props to be used in mines are prescribed as under:

1.0 Physical Properties:

Materials

Manufacturer shall specify the steel grades and characteristics from which the steel support has been made/manufactured.

- (a) The tensile strength of the steel grade used shall be at least 1.08 times the measured yield stress.
- (b) Elongation prior to fracture A of the steel grade used shall not be less than 10%.
- (c) The manufacturer of the support shall specify the design, calculations, Yield Strength and Ultimate Tensile Strength along with elongation at Yield and the factor of safety of the supports. The Steel support shall be as per the drawing and dimensions given by the manufacturer.

Dimension

Dimension of the support shall be as per the design and the tolerances specified in the IS: 1852 – 1985 or any other Standard as applicable.

2.0 Chemical Composition:

Chemical composition of the steel for manufacturing of the steel supports varies according to the requirement of strength characteristics and specific applications given by user. However certain chemical constituents of the steel which influence the required properties of steel are prescribed below:

Sl No.	Constituent	Percentage by weight
1	Carbon (c)	0.25 (Max)
2	Sulfur (S)	0.05 (Max)
3	Phosphorous(P)	0.05 (Max)
4	Manganese	1.7 (Max)
5	Other Alloying/micro alloying elements	0.50 (Max)

In this regard, reference may be made of IS 2062: 2006 for considerations and testing.

3.0 Physico-mechanical Properties:

- 3.1 At least two prototype samples shall be tested for type test at a National Test House or Laboratory.
- 3.2 At least 0.5% of the production shall be subjected to routine test or production test.

3.3 Axial Load test:

The Steel Prop, Cog or Chock shall be set vertically in a testing machine and the designed load is applied. The load-yield characteristics shall be obtained.

3.4 **Eccentric Load Test:**

The test shall be conducted on the Square Steel Prop, Cog/Chock by putting the support with an eccentricity of about 54 mm at the upper end.

3.5 **Overload Test:**

An overload test shall be conducted by subjecting the Steel Prop, Cog /Chock to a load equal to 1.20 time the designed load. The test shall be conducted for at least five loading cycle.

Minimum performance requirements:

- There shall be no visible deformation, distortion or failure of any part of the support.
- The minimum load bearing capacity of Steel prop shall be 20 Tonnes and for Cog/Chock 30 Tonnes.

However, the support can be manufactured and used of higher capacities as per the requirements of the user.

4.0 **Welding and Weld Tests**

All the parts and components of the supports structure if joined together by welding shall be welded with following the specified code of welding prescribed under various BIS. The welding stresses shall also be calculated and tested as prescribed under various BIS.

5.0 **Other Properties & Parameters**

(a) Weatherability:

The support and its components or parts shall be subjected to **Accelerated Weathering Test** in mine water condition for 20 days. No deterioration should occur on the Assembly.

(b) Accelerated Weathering Test shall also be conducted in acidic water condition for 20 days during which no deterioration should occur on the Assembly.

[Note: The AWT under mine water condition generally is at pH > 4 and that under acidic water condition is considered at pH-2 (5 % HCL aqueous solution) during testing. The test limit is that the loss of weight shall not be more than 5%]

(c) Corrosion Resistance Test:

The Support shall also be subjected to Field Exposure and Corrosion Resistivity Test as per IS- 5555: 1970 to test the resistance to corrosion of the steel support and its parts.

6. **Marking:**

Steel Prop, Cog or Chock shall be marked with the manufacturers name and/or registered trade mark, serial number, size and the designed load of the Square Steel Cog Stool/Chock.

7.0 In case the support or any of its part fail to pass the required tests at the user's end, that batch or lot of the manufacture shall not be used in the mine and intimation thereof shall be sent to the manufacturer. A record in this regard shall be maintained at the mine/company.

7.1 The Chief Inspector of Mines or an Inspector of Mines may inspect, check and examine the manufacturing facilities at any time and get samples tested during the course of inspection or send such samples for testing at any national test houses/laboratories at the cost of the manufacturer.

7.2 The Chief Inspector of Mines or an Inspector of Mines may inspect, check and examine the supports at any time in the mine or the area of the mines and get samples tested during the course of inspection or send such samples for testing at any national test houses/laboratories at the cost of manufacturer or user.

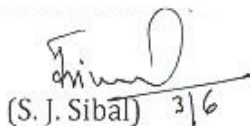
8.0 General Requirement

All the Owner, Agent and Manager including the manufacturers and suppliers shall be required to comply with this standard and any deviation or defects found in the product supplied or used in the mine, shall be brought to the notice of this Directorate.

Manufacturers and the Users including the Test Houses, who are engaged for testing of such material, are therefore requested to ensure the above mentioned Standard and Parameters before supplying and using at the mine.

The Standard, Parameters and Testing of Steel props, cogs and chocks as mentioned above, in this circular shall be considered as approved by the Chief Inspector of Mines by a general order as provided under regulation 181(3) of the Coal Mines Regulations, 1957. This is being issued in continuation of the gazette notification No. GSR 160 dated 14th August, 2008,

Yours Faithfully,



(S. J. Sibal) 3/6

Director General of Mines Safety