भारतीय मानक

Indian Standard

IS 12464 : 2024

खदानों में प्रयोग किए जाने वाले रूफ बार्स — परीक्षण पद्धतियाँ

(पहला पुनरीक्षण)

Roof Bars Used in Mines — Methods of Test

(First Revision)

ICS 73.100.01

भारतीय मानक ब्यूरो
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Mining Techniques and Equipment Sectional Committee, MED 08

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Mining Techniques and Equipment Sectional Committee, had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1988. The present revision has been taken up with a view to incorporate the modification found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated.

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

For the purpose of deciding whether a particular requirement 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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. 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

ROOF BARS USED IN MINES — METHODS OF TEST

(First Revision)

1 SCOPE

This standard covers the methods of tests for roof bars (both link bars and uncoupled bars) used in mines.

Tests in addition to those given in this standard may be carried out as agreed to between the manufacturer and the purchaser, or as required by the statutory authority.

2 INFORMATION TO BE SUPPLIED BY THE MANUFACTURER

The manufacturer shall provide the information regarding classification, type, other details for identification and overall dimensioned drawing of the bars supplied.

3 TESTS AND TEST METHODS

3.1 Bend Test on Bar Section

The roof bar shall be simply supported at two points with a specified span and loaded centrally through a standard crown of a prop. The bar shall be loaded gradually up to a specified load corresponding to the bending moment of the bar. With this load acting, the deflection of the bat at the centre, which, is at the point of application of the load, shall be measured and recorded.

3.2 Bend Test on Joint

The bars shall be linked together and set in line by inserting the pin and wedge or by means of pin and shackle. The bars shall then be simply supported over a specified span. With the hinge pin positioned at mid-span, two equal loads of a specified magnitude shall be applied gradually. With the specified loads acting on the bars, the deflection of the bars at the hinge pin shall be measured and recorded.

3.3 Reverse Bend Test on Bar Section

The roof bar shall be centrally loaded through a standard crown of a prop. The bar shall be gradually loaded until the central deflection is of a specified value or until the load reaches a specified value whichever occurs first. The bar shall then be turned over and loaded again until the central deflection is of the specified value in the opposite direction or until the load reaches a specified value whichever occurs first. This cycle shall be repeated for a specified number of times.

3.4 Crushing Test

3.4.1 The roof bar shall be placed on a flat surface with a minimum specified length, and a specified load shall be applied centrally with respect to the support length and gradually perpendicular to the flange of the bar through a standard crown of a prop at the point of support for props. After this test, the bar shall be checked for any permanent deformation.

3.4.2 The bar shall be tested as in 3.4.1 except that the crown shall be inclined laterally at an angle of 10° to the normal. The bar shall be checked to see whether it withstands a specified crushing load at the point of support for props.

3.5 Destruction Test on Bar Section

The roof bar simply supported shall be centrally loaded through a standard crown of a prop. The load shall be gradually increased till the failure of the bar section occurs. The maximum bending moment of the bar section at failure shall be determined. The deflections of the bar at the centre of the span at different loads (in steps of 10 kN or 1 tonne after nominal bending moment) shall also be noted.

3.6 Destruction Test on Joint

Two roof bars shall be linked together and loaded. The equal loads shall be increased gradually until the joint (or bar) failure occurs. The maximum bending moment of the joint at failure shall be determined. The deflections at the hinge pin with different loads shall also be noted.

3.7 Cantilever Test

The fixed bar of a two-bar cantilever shall be mounted between a standard crown of a prop and a flat steel plate so that the centre of the crown coincides with the quarter bar position nearer the fork end. An end load of a specified magnitude is gradually applied and deflection is measured. As a cantilever, the bar shall sustain a minimum specified load before deflecting a specified value measured at the end of the bar. For uncoupled bars, the load shall be applied at or near the end remote from the prop. The distance between the point of load application and the nearest edge of the prop head shall be of a specified value.

3.8 Flaw Sensitivity Test

A saw cut shall be made transversely across the flange of the bar section at the centre of the test span with a previously unused sharp blade having 710 teeth per metre rate. The saw cut shall be 2 mm deep for sections up to 88 mm total depth and 3 mm deep for sections over 88 mm total depth. A bend test shall be made over a span of 700 mm with the saw cut on the tension side and with single point central loading on the opposite face using the standard prop cap or with a knife edge to the full bar width. The load shall be applied at such a rate that the deflection at the bar centre after the yield occurs, takes place at approximately 10 mm per minute. The test shall be carried out at a temperature of 300 K ± 2 K. Bending shall continue until the fracture occurs. If the fracture does not take place on the first bend, to the limits of the deflection which can be applied, the bar shall be straightened, the depth of saw cut increased by 1 mm and the test repeated.

3.9 Mode of Failure

Mode of failure of the bar, if any in any of the tests in **3.1** to **3.8** shall be ductile rather than brittle and shall not be in an abrupt manner.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Mining Techniques and Equipment Sectional Committee, MED 08

Organization	*Representative(s)*
Directorate General of Mines Safety, Dhanbad	SHRI SAIFULLAH ANSARI **(*Chairperson*)** SHRI M. ARUMUGAM (*Alternate*)
Andhra Pradesh Heavy Machinery and Engineering Limited, Vijaywada	SHRI T. V. RAMANA
BEML Limited, Bengaluru	SHRI V. R. S. PRASAD RAO SHRI H. G. SURESH (*Alternate*)
Bharat Coking Coal Limited, Dhanbad	SHRI P. K. SINHA
Caterpillar India Private Limited, Chennai	SHRI K. REJI JOSE
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	DR MANOJ KUMAR SINGH SHRI SURAJIT DEY (*Alternate* I) PROF S. K. KASHYAP (*Alternate* II)
Eastern Coalfields Limited, Dishergarh	DR MANAS KUMAR
Eimco Elecon (India) Limited, Vallabh Vidyanagar	SHRI RAM RAMESH KALE SHRI VINAY JAYNARAYAN SHARMA (*Alternate*)
Hindustan Zinc Limited, Kolkata	SHRI B. V. RAO
Indian Institute of Technology (ISM), Dhanbad	SHRI L. A. KUMARASWAMIDHAS
John Deere India Private Limited, Mumbai	SHRI KARTHIK KALIAPPAN
Manganese Ore Limited, Nagpur	SHRI RAKESH KU. VERMA SHRI ATUL SHARMA (*Alternate* I) SHRI ASHWINI BAGHELE (*Alternate* II)
Nanda Millar Company, Kolkata	SHRI J. P. GOENKA SHRI MADHUR GOENKA (*Alternate*)
National Mineral Development Corporation, Hyderabad	SHRI D. RAJASEKARAN
South Eastern Coalfields Limited, Bilaspur	SHRI KAPIL K. RAI SHRI D. BHATTACHARJEE (*Alternate*)
Tata Steel Limited, Dhanbad	SHRI SOUMENDHU MANJHI SHRI ABINASH JHA (*Alternate*)
BIS Directorate General	SHRI NAVINDRA GAUTAM, SCIENTIST 'E'/DIRECTOR AND HEAD (MECHANICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI SHUBHAM YADAV
SCIENTIST 'B'/ASSISTANT DIRECTOR
(MECHANICAL ENGINEERING), BIS

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