AS 3751—1990

Australian Standard®

Underground mining—Slope haulage—Couplings, drawbars, and safety chains

This Australian Standard was prepared by Committee ME/18, Mining Equipment. It was approved on behalf of the Council of Standards Australia on 20 October 1989 and published on 12 March 1990.

The following interests are represented on Committee ME/18:

- Australian Coal Association
- Australian Mining Industry Council
- Broken Hill Mining Managers Association
- Bureau of Steel Manufacturers of Australia
- Chamber of Mines of Western Australia
- Confederation of Australian Industry
- Department of Industry Technology and Resources, Victoria
- Department of Minerals and Energy, New South Wales
- Department of Mines, Tasmania
- Department of Mines, Western Australia
- Department of Resource Industries
- Institution of Engineers, Australia
- Institution of Mining Electrical and Mining Mechanical Engineers
- New South Wales Coal Association
- Queensland Chamber of Mines
- Queensland Coal Association
- Queensland Coal Board
- South Australian Chamber of Mines
- The Australasian Institute of Mining and Metallurgy
- University of New South wales

Additional interests participating in preparation of Standard:

- Department of Mineral Resources, New South Wales
- Mining Companies
- Mining Consultants
- Mining Equipment Manufacturers and Suppliers

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PREFACE

This Standard was prepared by the Standards Australia Committee on Mining Equipment.

This Standard includes requirements for steel of 1.5% manganese which was previously included in AS M3, 1.5 percent manganese steel for colliery tub, skip or mine-car drawbars, shackles and couplings and detaching hooks, which has been withdrawn.

Reference has been made to British Coal documents in the preparation of Appendix B, viz *'Design Guide for Cage Suspension Gear'* and *'Procedure for Examining Cage Suspension Gear at Testing Centres'*.

CONTENTS

FOREWORD

Couplings and drawbars are generally used to connect conveyances together in slope haulage rail systems. As well, couplings and drawbars may be used to connect conveyances for travel within the mine, in which case the drawbars should not be subject to compressive forces, e.g. shunting operations.

STANDARDS AUSTRALIA

Australian Standard
Underground mining—Slope haulage—Couplings, drawbars, and safety chains

1 SCOPE. This Standard specifies requirements for materials and for the design and manufacture of couplings, drawbars, and safety chains which connect slope haulage conveyances in underground mines.

NOTES:
1. Recommendations for inspection and maintenance are given in Appendix C.
2. Information on ruling section and equivalent section is given in Appendix D.
3. Guidelines on the design of threaded components are given in Appendix E.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1050 Methods for the analysis of iron and steel
1065 Non-destructive testing—Ultrasonic testing of carbon and low alloy steel forgings
1171 Methods for magnetic particle testing of ferromagnetic products and components
1204 Structural steels—Ordinary weldable grades
1213 Iron and steel—Methods of sampling
1227 General requirements for the supply of hot-rolled steel plates, sections, piling and bars for structural purposes
1275 Metric screw threads for fasteners
1391 Methods for tensile testing of metals
1442 Carbon steels and carbon-manganese steels—Hot-rolled bars and semi-finished products
1447 Hot-rolled spring steels
1448 Carbon steels and carbon-manganese steels—Forgings (ruling section 300 mm maximum)
1544 Methods for impact tests on metals
1544.2 Part 2: Charpy V-notch
1554 SAA Structural Steel Welding Code
1554.1 Part 1: Welding of steel structures
1710 Non-destructive testing of carbon and low alloy steel plate—Test methods and quality classification
1733 Methods for the determination of grain size in metals
2074 Steel castings
2506 Wrought alloy steels—En series
2536 Surface texture
B199 Undercuts and runouts for screw threads
K1 Methods for the sampling and analysis of iron and steel

3 DEFINITIONS. For the purpose of this Standard, the definitions below apply.

3.1 Shall—indicates that a statement is mandatory.

3.2 Should—indicates a recommendation.

3.3 Statutory Authority—an authority having statutory powers to approve the design, manufacture, and use of mine suspension equipment in the State or Territory within the Commonwealth of Australia in which the equipment is to be used.

3.4 Approved and approval—approved by or approval of the Statutory Authority.

3.5 Coupling—an attachment used to connect conveyances together to form a train. It is usually a male/female assembly and may be fixed or pivoted (see Figures 1 to 8).

3.6 Slope haulage—any grade of trackwork on which traction effort cannot be achieved practicably by friction.

3.7 Drawbar—an attachment used to connect conveyances together to create a greater distance between them than if a coupling alone is used (see Figures 9 to 12).

3.8 Coupling pin—a pin which connects the couplings or drawbars together.

3.9 Pivot pin—a pin which attaches the pivoted type coupling to the chassis of the conveyance.

3.10 Safety chain—a chain consisting of chain links and end links which prevents the conveyance from separating in the event of a coupling failure.

3.11 Conveyance—any rail mounted car, carriage, or trolley in which persons, minerals, or materials are hauled in underground mines.

3.12 Safe working load—the maximum static tensile load permitted to be carried by the coupling or drawbar.

3.13 Static factor of safety—the ratio of the ultimate load of the coupling or drawbar to the safe working load.

3.14 Ultimate load—the minimum tensile load which when applied to a coupling or drawbar will produce a complete functional collapse of the component assembly.

4 MATERIALS.

4.1 Component type designation. The components of couplings and drawbars shall be designated Type A, Type B, Type C, or Type D in accordance with Table 1.

NOTE: Other designs of couplings and drawbars may be permitted.