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COMPLETE A
THE SPECIFIED CLOSING

# 1 SAFEWORK AUSTRALIA

## UNDERGROUND WINDING SYSTEMS
## DRAFT MINING CODES OF PRACTICE FEEDBACK/COMMENT 6TH SEPTEMBER 2011.

Document reference : GEACFB911

## 1.1 GENERAL DOCUMENT COMMENTS.

a) The proposed code reflects design of older manual driven winders and associated management philosophies including responsibilities of managers, designs etc.

b) There is no recognition and detail necessary for what is the primary cause of safety related incident with winders. IE: The brake control, inclusive of the electrical control and protection system that supports it.

c) There is no recognition/stipulation for change management criteria surrounding such electric control.

d) Document layout is not consistent with a modern day standards approach. Ie: definitions, references etc. Selective nomination of various standards when standards are already referenced leaves the end user unclear of other referenced standards compliance requirements. (given the "should" requirement). Eg: non use of hammerlocks and requirements that "should" comply AS3637.

e) Definition of a winder should suggest… For the purpose of clause Cl 3(1) 'of the Coal Mine Health and Safety Regulation 2006 a 'powered winding system' means any mechanical winch or hoist powered by air, electricity, internal combustion, water, or hydraulic power or operated by a force of gravity designed for the purpose of lifting or lowering persons or heavy materials to or from different levels within the underground mine and/or to the surface of the mine by means of a cable or chain attached to a skip, cage, bucket, or other type of conveyance.

f) The document is primarily targeted towards manual winders. There is little and at times contradictory terms when relating to automatic winders. This needs clarification. Note that the majority of winders on the Eastern seaboard of Australia have some degree of automation followed by many with full automatic control.

g) There is no reference regards how the small opal mines should comply or otherwise in the proposed document.
There should be exclusion clause regards maximum 2 man riding, depths to 40m and speed limitations consistent with NSW recognised standards that will provide the opal mines own requirements.

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## 1.2 DESIGN STANDARDS PROPOSED IN CODE OF PRACTICE.

### 1.2.1 DOCUMENT UNCLEAR TO COVER THE VARIOUS WINDER TYPES.

Comment:

a) Currently specific to Vertical shaft drum winders.
b) No information for Drift winders and associated equipment,

#### 1.2.1.1 RECOMMEND PROVISION FOR

i. Drift or slope drum winders
ii. Vertical shaft drum winders
iii. Shaft sinking winders
iv. Friction winders
(Note: NSW D.I.I nsw has reviewed current MDG33 that provides these requirements.)

### 1.2.2 NOMINATED DESIGN STANDARDS INADEQUATE IN PROPOSED CODE.

Contained in the main body of the proposed code document “Section 1 Design of winding systems” are the following

- Headframes are stated as “should comply” to AS3785.5 (Section 1.1)
- Sheaves are stated as “should comply” to AS3785.7 (Section 1.2)
- Conveyances are stated as “should comply” to AS3785.4 (Section 2.4)
- Attachments are stated as “should comply” to AS3637. (Section 2.5)

Comment:
The above sections all follow on with small sections of the same Australian standard being outlined in the document.
This is unnecessary and more importantly can detract from significant points in the standard given that the smaller details in the code are still only nominated as “should”.
If the code is to provide “consideration to various sections of the Australian standards, this has not been done and leaves uncertainty of what must be done and what should be considered regards the Australian standards.

a) There are no directions provided for guide rope standard design and layout, tensioning, examination periods,
b) There is no provision for required design and manufacturing standards relating conveyances.
c) There is no provision for drum shaft design standards.
d) There is no provision for gearbox and drive design standards.

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e) There is no requirement to comply to AS1657, Platform, ladder and stairways, rather than audit against it.
f) There is no requirement or nomination regards guiding and arrestor systems,
g) There is no requirement or nomination for headframe and drive foundations,
h) There is no requirement or nomination regards the winding Drum, design etc.
i) There is no requirement or nomination regards “Guarding and fencing” and requirement to inhibit people away from potential crush points often found when riding conveyances in the shaft.
j) There is little requirement or nomination regards safety control protection devices, their design, use including testing.

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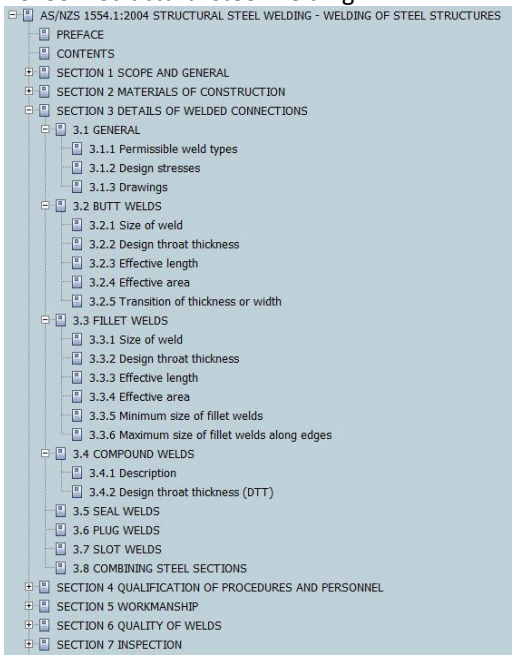
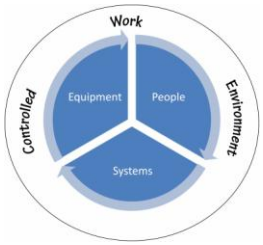
### 1.2.2.1 RECOMMENDATIONS REGARDS DESIGN STANDARDS

By contrast to the proposed Code, the current NSW MDG33, Together with Compliance to AS1403 regards drum shafts and Guidance for drum design the following standards are specified either directly in MDG33 and/or referenced for compliance and consideration as noted:

a) AS1554. Structural steel welding.




b) AS3600. Concrete structures.

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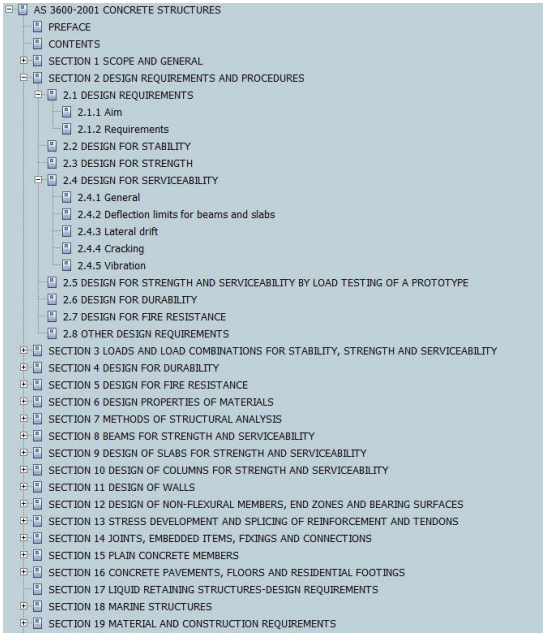
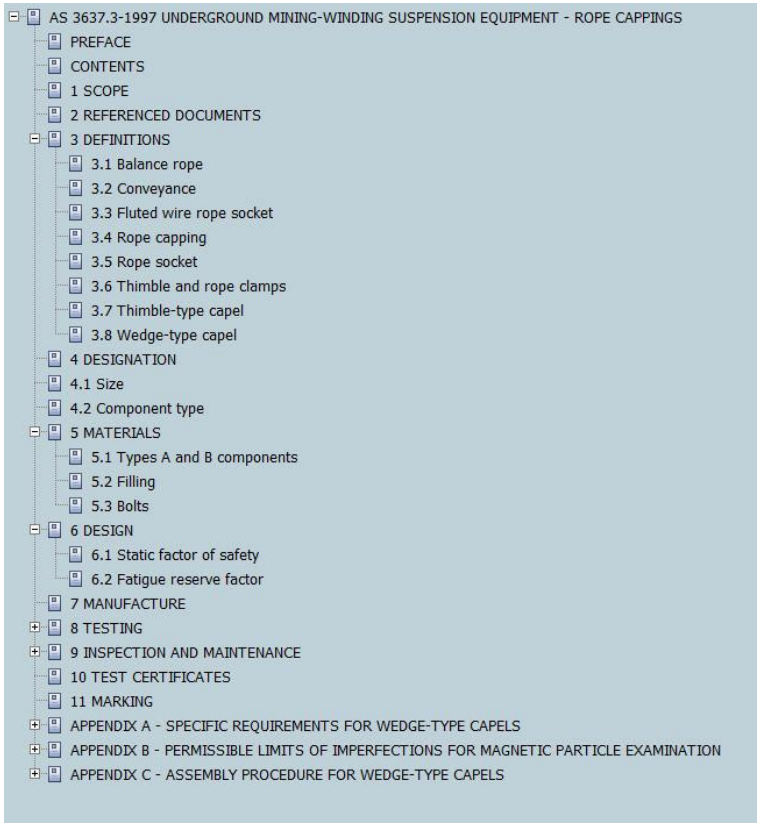
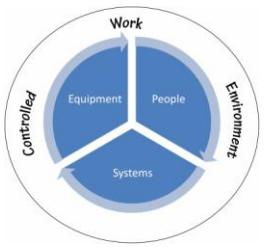



AS3637.3 Suspension equipment. Rope cappings.



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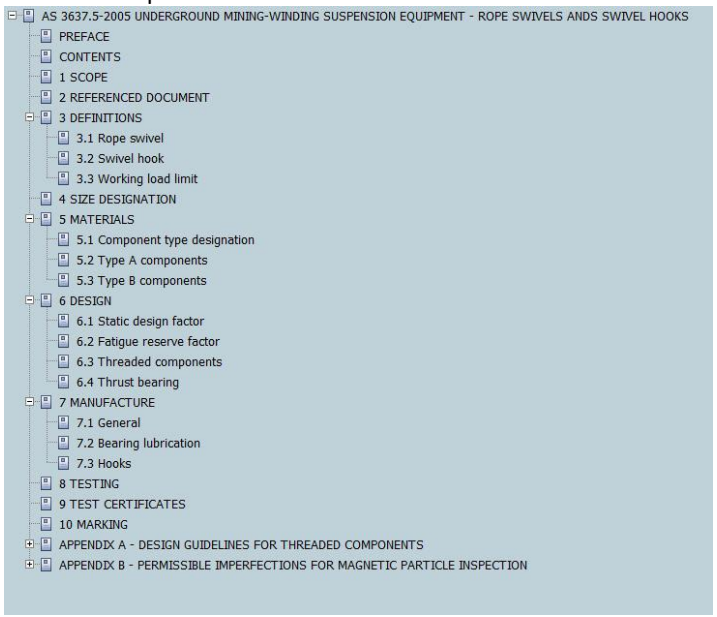
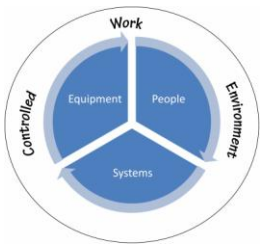
AS3637.5. Rope swivels and hooks.




AS 3751 slope haulage couplings, drawbars and safety chains.

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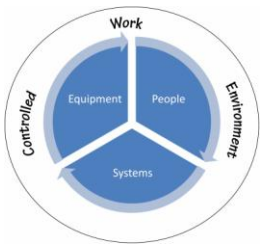
- AS 3751-2005 UNDERGROUND MINING-SLOPE HAULAGE-COUPLINGS, DRAWBARS, AND SAFETY CHAINS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
    - 3.1 Conveyance
    - 3.2 Coupling
    - 3.3 Coupling pin
    - 3.4 Drawbar
    - 3.5 Pivot pin
    - 3.6 Safe working load
    - 3.7 Safety chain
    - 3.8 Shall
    - 3.9 Should
    - 3.10 Slope haulage
    - 3.11 Static factor of safety
    - 3.12 Statutory authority
    - 3.13 Ultimate load
  - 4 MATERIALS
  - 5 DESIGN
    - 5.1 Static factor of safety
    - 5.2 Axially loaded threaded components
    - 5.3 Safety chains
  - 6 MANUFACTURE
    - 6.1 All components
    - 6.2 Type A components
    - 6.3 Safety chains
    - 6.4 Threads and nut locking
    - 6.5 Protective coatings
      - 6.5.1 Type A and Type C component
      - 6.5.2 Type B and Type D components
  - 7 TESTING
  - 8 TEST CERTIFICATES
  - 9 MARKING
  - 10 USAGE
  - 11 INSPECTION AND MAINTENANCE

AS3785.5 Shaft headframes.

- AS 3785.5-1998 UNDERGROUND MINING—SHAFT EQUIPMENT— HEADFRAMES
  - PREFACE
  - CONTENTS
  - SECTION 1 SCOPE AND GENERAL
  - SECTION 2 LOAD CALCULATIONS
    - 2.1 GENERAL
    - 2.2 DEAD LOADS (WDL)
    - 2.3 LIVE LOADS (WL)
    - 2.4 WORKING LOADS (Wwk)
    - 2.5 EMERGENCY LOADS (Wem)
    - 2.6 WIND LOADS (Ww)
    - 2.7 EARTHQUAKE LOADS (WEQ)
    - 2.8 FOOTING SETTLEMENT LOADS (Wftg)
    - 2.9 TEMPERATURE EFFECT LOADS (Wtemp)
  - SECTION 3 DESIGN
    - 3.1 STRUCTURAL DESIGN
    - 3.2 PARTIAL LOAD FACTORS
    - 3.3 LOAD COMBINATIONS
    - 3.4 STIFFNESS
    - 3.5 VIBRATION
    - 3.6 STABILITY
    - 3.7 PLATFORM AND ACCESS REQUIREMENTS
    - 3.8 FOOTING SETTLEMENT
    - 3.9 TEMPERATURE EFFECTS

AS3785.6. Shaft guides and rubbing ropes

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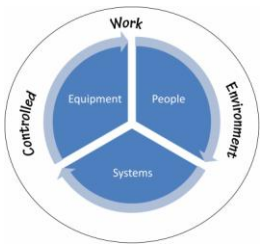
- AS 3785.6-1992 UNDERGROUND MINING-SHAFT EQUIPMENT - GUIDES AND RUBBING ROPES FOR CONVEYANCES
  - PREFACE
  - CONTENTS
  - FOREWORD
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
    - 3.1 Approved and approval
    - 3.2 Bunton/dividers
    - 3.3 Chairing
    - 3.4 Conveyance
    - 3.5 Conveyance guide assemblies
    - 3.6 Dead loads
    - 3.7 Gripper system
    - 3.8 Guides
    - 3.9 Live load
    - 3.10 Overwind
    - 3.11 Rope break force
    - 3.12 Rubbing ropes
    - 3.13 Shall
    - 3.14 Should
    - 3.15 Statutory authority
  - 4 MATERIALS
    - 4.1 General
    - 4.2 Rigid steel guides
    - 4.3 Rigid timber guides
    - 4.4 Wire rope guides and rubbing ropes
    - 4.5 Rope suspension glands
  - 5 STRUCTURAL DESIGN
  - 6 CONSTRUCTION DESIGN
  - 7 MANUFACTURE
  - APPENDIX A - TYPICAL GUIDE LOAD DETERMINATION METHODS FOR RIGID GUIDES

AS 3785.7 Personnel conveyances in other than vertical shafts.

- AS 3785.8-1994 UNDERGROUND MINING-SHAFT EQUIPMENT - PERSONNEL CONVEYANCES IN OTHER THAN VERTICAL SHAFTS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
  - 4 MATERIALS
    - 4.1 Main load-bearing components
    - 4.2 Other than main load- bearing components
  - 5 STRUCTURAL DESIGN
    - 5.1 Loads
    - 5.2 Load combinations
    - 5.3 Structural design
  - 6 CONSTRUCTION DESIGN
    - 6.1 Compartment
    - 6.2 Body
    - 6.3 Chassis, suspension and wheel assemblies
    - 6.4 Track brakes
    - 6.5 Attachments
    - 6.6 Control car
    - 6.7 Other requirements
  - 7 WELDING
  - 8 CONTROL SYSTEM
    - 8.1 Installation of electrical apparatus
    - 8.2 Overspeed device
    - 8.3 Signalling
    - 8.4 Control and warning systems for control cars
    - 8.5 Controls and warning systems for personnel cars
  - 9 INSPECTION AND TESTING
  - 10 TEST CERTIFICATE
  - 11 MARKING
  - APPENDIX A - INFORMATION TO BE PROVIDED BY THE PURCHASER
  - APPENDIX B - INFORMATION TO BE PROVIDED BY THE SUPPLIER

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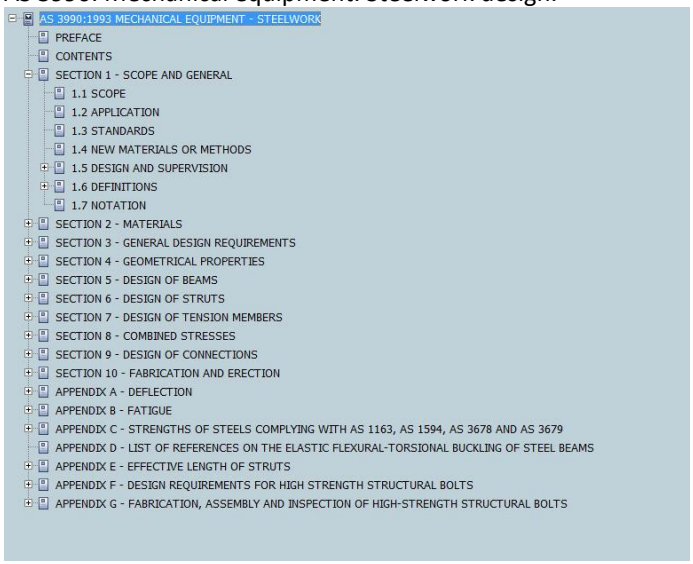
AS 3990. Mechanical equipment. Steelwork design.




AS 4100 Steel Structures

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COMPLETE A
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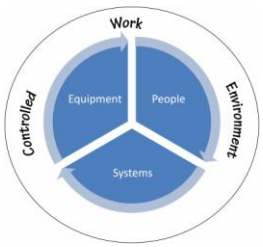
- AS 4100-1998 STEEL STRUCTURES
  - PREFACE
  - CONTENTS
  - SECTION 1 SCOPE AND GENERAL
  - SECTION 2 MATERIALS
  - SECTION 3 GENERAL DESIGN REQUIREMENTS
    - 3.1 DESIGN
    - 3.2 LOADS AND OTHER ACTIONS
    - 3.3 STABILITY LIMIT STATE
    - 3.4 STRENGTH LIMIT STATE
    - 3.5 SERVICEABILITY LIMIT STATE
    - 3.6 STRENGTH AND SERVICEABILITY LIMIT STATES BY LOAD TESTING
    - 3.7 BRITTLE FRACTURE
    - 3.8 FATIGUE
    - 3.9 FIRE
    - 3.10 EARTHQUAKE
    - 3.11 OTHER DESIGN REQUIREMENTS
  - SECTION 4 METHODS OF STRUCTURAL ANALYSIS
  - SECTION 5 MEMBERS SUBJECT TO BENDING
  - SECTION 6 MEMBERS SUBJECT TO AXIAL COMPRESSION
  - SECTION 7 MEMBERS SUBJECT TO AXIAL TENSION
  - SECTION 8 MEMBERS SUBJECT TO COMBINED ACTIONS
  - SECTION 9 CONNECTIONS
  - SECTION 10 BRITTLE FRACTURE
  - SECTION 11 FATIGUE
  - SECTION 12 FIRE
  - SECTION 13 EARTHQUAKE
  - SECTION 14 FABRICATION
  - SECTION 15 ERECTION
  - SECTION 16 MODIFICATION OF EXISTING STRUCTURES
  - SECTION 17 TESTING OF STRUCTURES OR ELEMENTS

AS3569 Steel wire ropes.

- AS 3569-1989 STEEL WIRE ROPES
  - PREFACE
  - CONTENTS
  - SECTION 1. SCOPE AND GENERAL
  - SECTION 2. ROPE DESIGNATIONS
    - 2.1 DESIGNATION.
    - 2.2 SIZE.
    - 2.3 SURFACE FINISH OF THE WIRES.
    - 2.4 ROPE CONSTRUCTION.
    - 2.5 GRADE OF ROPE.
    - 2.6 DIRECTION OF LAY.
    - 2.7 MINIMUM BREAKING FORCE OF ROPE.
    - 2.8 LINEAR MASS.
    - 2.9 EXAMPLES OF ROPE DESIGNATIONS.
    - 2.10 TABLES OF LINEARMASSAND BREAKING FORCE.
  - SECTION 3. MATERIALS
    - 3.1 WIRE.
    - 3.2 WIRE GRADE.
    - 3.3 FIBRE CORES.
    - 3.4 LUBRICANTS.
    - 3.5 GALVANIZING.
  - SECTION 4. MANUFACTURE
    - 4.1 CORE OF ROPES.
    - 4.2 CORE OF STRANDS.
    - 4.3 DIRECTION OF LAY OFROPE.
    - 4.4 FORMING.
    - 4.5 LUBRICATION.
    - 4.6 JOINTS.
    - 4.7 FREEDOM FROM DEFECTS AFTER MANUFACTURE.
    - 4.8 FINISHED DIMENSIONS.
    - 4.9 MASS OF ROPE.
  - SECTION 5. MARKING AND PACKING
  - SECTION 6. TEST REQUIREMENTS
  - APPENDIX A - PURCHASING GUIDELINES
  - APPENDIX B - GUIDELINES FOR ROPE SELECTION
  - APPENDIX C - LOCKED AND HALF-LOCKED COIL ROPES
  - APPENDIX D - CALCULATION OF STEEL WIRE ROPE BREAKING FORCE
  - APPENDIX E - PREVIOUS STEEL WIRE ROPE DESIGNATION SYSTEM

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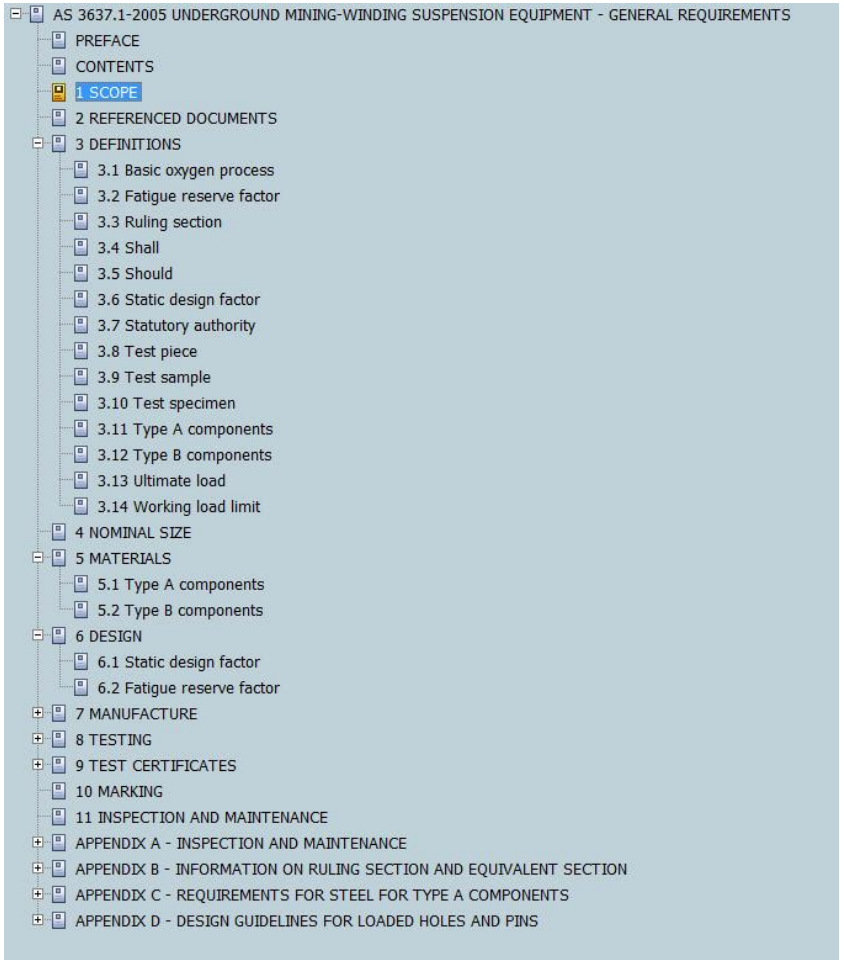
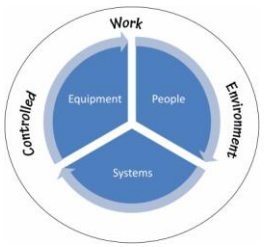
AS3637.1 Winding suspension equipment.



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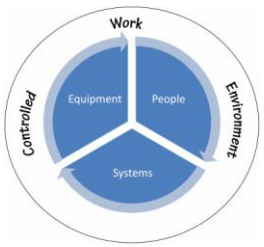
AS3637.2 Detaching hooks.

- AS 3637.2-2005 UNDERGROUND MINING-WINDING SUSPENSION EQUIPMENT - DETACHING HOOKS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
    - 3.1 Catchplate/detaching bell
    - 3.2 Conveyance
    - 3.3 Detaching hook
  - 4 SIZE DESIGNATION
  - 5 MATERIALS
    - 5.1 Component type designation
    - 5.2 Type A components
    - 5.3 Type B components
    - 5.4 Shear pins
  - 6 DESIGN
    - 6.1 Static factor of safety
    - 6.2 Fatigue reserve factor
    - 6.3 Shear pin
    - 6.4 Locking
  - 7 MANUFACTURE
    - 7.1 General
    - 7.2 Gauging
    - 7.3 Catchplates/detaching bells
    - 7.4 Shear pin
    - 7.5 Gauge marks
  - 8 PERMISSIBLE IMPERFECTIONS
  - 9 TESTING
  - 10 TEST CERTIFICATES
  - 11 MARKING
  - 12 ACCOMPANYING INFORMATION
  - APPENDIX A - DESIGN GUIDELINES FOR THE HOOK REGION
  - APPENDIX B - PERMISSIBLE IMPERFECTIONS FOR MAGNETIC PARTICLE INSPECTION

AS3637.4. Drawbars and connecting links.

- AS 3637.4-2002 UNDERGROUND MINING-WINDING SUSPENSION EQUIPMENT - DRAWBARS AND CONNECTING LINKS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENT
  - 3 DEFINITIONS
  - 4 DESIGNATION
  - 5 MATERIALS
  - 6 DESIGN AND MANUFACTURE
  - 7 TESTING
  - 8 TEST CERTIFICATES
  - 9 MARKING
  - APPENDIX A - DESIGN GUIDELINES FOR CHASE BLOCKS
  - APPENDIX B - DESIGN GUIDELINES FOR THREADED COMPONENTS
    - B1 SCOPE
    - B2 GENERAL CONSIDERATIONS
    - B3 STATIC DESIGN
    - B4 FATIGUE DESIGN
  - APPENDIX C - PERMISSIBLE IMPERFECTIONS FOR MAGNETIC PARTICLE INSPECTION

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AS 3637.6 Shackles and chains.

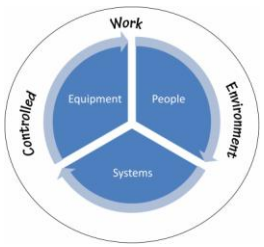
- AS 3637.6-2005 UNDERGROUND MINING-WINDING SUSPENSION EQUIPMENT - SHACKLES AND CHAINS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENT
  - 3 DEFINITIONS
    - 3.1 Chain
    - 3.2 Conveyance
    - 3.3 Conveyance chain
    - 3.4 Rating
    - 3.5 Safety chain
    - 3.6 Shackle
  - 4 SIZE DESIGNATION
  - 5 MATERIALS
    - 5.1 Component type designation
    - 5.2 Type A components
    - 5.3 Type B components
  - 6 DESIGN
    - 6.1 Static design factor
    - 6.2 Fatigue reserve factor
    - 6.3 Rating (see Figure 3)
    - 6.4 Safety chain length
  - 7 MANUFACTURE
  - 8 TESTING
    - 8.1 Proof load tests
      - 8.1.1 Shackles and chains
      - 8.1.2 Master links
      - 8.1.3 Shackle connections
    - 8.2 Non-destructive testing
    - 8.3 Length of chains
    - 8.4 Wear limits
  - 9 TEST CERTIFICATES
  - 10 MARKING
  - APPENDIX A - GUIDELINES FOR STATIC AND FATIGUE DESIGN OF SHACKLES
  - APPENDIX B - GUIDELINES FOR STATIC AND FATIGUE DESIGN OF CHAIN LINKS
  - APPENDIX C - PERMISSIBLE IMPERFECTIONS FOR MAGNETIC PARTICLE INSPECTION

AS3785.1 Shaft overwind catch equipment.

- AS 3785.1-2006 UNDERGROUND MINING-SHAFT EQUIPMENT - SHAFT OVERWIND SAFETY CATCH SYSTEM
  - PREFACE
  - CONTENTS
  - FOREWORD
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
  - 4 MATERIALS
  - 5 DESIGN
  - 6 TESTING
  - 7 TEST CERTIFICATES
  - APPENDIX A - INFORMATION TO BE PROVIDED BY THE PURCHASER
  - APPENDIX B - INFORMATION TO BE PROVIDED BY THE SUPPLIER

AS 3785.2 Shaft arresting systems.

- AS 3785.2-2006 UNDERGROUND MINING-SHAFT EQUIPMENT - SHAFT WINDING ARRESTING SYSTEMS
  - PREFACE
  - CONTENTS
  - FOREWORD
  - 1 SCOPE
  - 2 DEFINITIONS
  - 3 MATERIALS
  - 4 DESIGN
  - 5 MANUFACTURE AND TESTING
  - 6 TEST CERTIFICATES
  - APPENDIX A - INFORMATION TO BE PROVIDED BY THE PURCHASER
  - APPENDIX B - INFORMATION TO BE PROVIDED BY THE SUPPLIER

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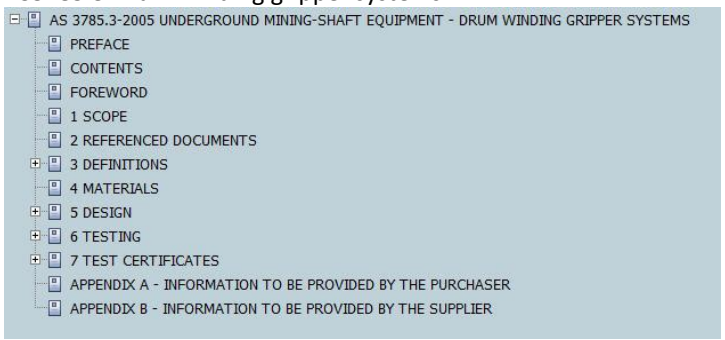
AS3785.3 Drum winding gripper systems.




AS3785.4 Conveyances for vertical shafts

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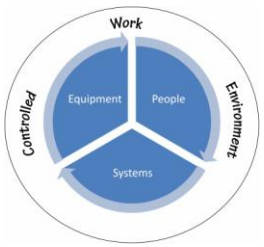
- AS/NZS 3485.4:2002 UNDERGROUND MINING-SHAFT EQUIPMENT - CONVEYANCES FOR VERTICAL SHAFTS
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
  - 4 RATING
  - 5 MATERIALS
  - 6 STRUCTURAL
    - 6.1 Loads
    - 6.2 Load combinations
      - 6.2.1 Main loadbearing components
      - 6.2.2 Other than main loadbearing components
    - 6.3 Design
  - 7 COMPONENTS
    - 7.1 General
    - 7.2 Conveyances for people
    - 7.3 Conveyances for materials
    - 7.4 Conveyances for minerals
      - 7.4.1 Skips
      - 7.4.2 Kibbles
    - 7.5 Counterweights
    - 7.6 Stages
    - 7.7 Attachments
  - 8 CONVEYANCE GUIDING ASSEMBLIES
    - 8.1 General
    - 8.2 Guide shoes and slipper assemblies
    - 8.3 Guide wheel assemblies
  - 9 WELDING
  - 10 INSPECTION AND TESTING
  - 11 TEST CERTIFICATE
  - 12 MARKING
  - APPENDIX A - INFORMATION TO BE PROVIDED BY THE PURCHASER
  - APPENDIX B - INFORMATION TO BE PROVIDED BY THE SUPPLIER

- AS 3785.7-2006 UNDERGROUND MINING-SHAFT EQUIPMENT - SHEAVES
  - PREFACE
  - CONTENTS
  - 1 SCOPE
  - 2 REFERENCED DOCUMENTS
  - 3 DEFINITIONS
  - 4 MATERIALS
  - 5 MANUFACTURE
  - 6 DESIGN
    - 6.1 Loads
    - 6.2 Load combination
      - 6.2.1 Static design
      - 6.2.2 Fatigue design
    - 6.3 Design criteria
      - 6.3.1 Rim, spoke, web and hub (including connections)
      - 6.3.2 Shafts
      - 6.3.3 Bearings
      - 6.3.4 Construction design
  - 7 NON-DESTRUCTIVE TESTING
  - 8 TEST CERTIFICATES
    - 8.1 Certificates required
  - 9 MARKING
  - APPENDIX A - INFORMATION TO BE PROVIDED BY THE PURCHASER
  - APPENDIX B - INFORMATION TO BE PROVIDED BY THE SUPPLIER
  - APPENDIX C - SHEAVE RIM DIMENSIONAL PROPORTIONS
  - APPENDIX D - TREAD PRESSURE BETWEEN ROPE AND SHEAVE
  - APPENDIX E - SHEAVE DIAMETER
  - APPENDIX F - ALLOWABLE WEAR FOR SHEAVE RIMS WITHOUT INSERTS

Note that it is recommended in addition to AS 3785.7 for inclusion of a captive device installed at the headsheave to reduce rope disengagement of the sheave during use. This has occurred on several occasions in NSW mines with significant damage and potential safety implication.

AS3785.7 Sheaves

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AS4812. NDT and discard criteria for ropes

- AS/NZS 4812:2003 NON-DESTRUCTIVE EXAMINATION AND DISCARD CRITERIA FOR WIRE ROPES IN MINE WINDING SYSTEMS
  - PREFACE
  - CONTENTS
  - SECTION 1 SCOPE AND GENERAL
  - SECTION 2 NON-DESTRUCTIVE EXAMINATION (NDE)
    - 2.1 EXAMINERS
      - 2.1.1 Competency and training
      - 2.1.2 Competency assessments
      - 2.1.3 Visual acuity
    - 2.2 EM INSTRUMENTS
    - 2.3 CALIBRATION
    - 2.4 ROPE EXAMINATIONS
      - 2.4.1 General
      - 2.4.2 Reference values of new rope
      - 2.4.3 Frequency
      - 2.4.4 Preparation for an examination
      - 2.4.5 Procedure for non-destructive (EM) tests
      - 2.4.6 Procedure for visual inspection
      - 2.4.7 Interpretation of results
      - 2.4.8 Additional examination
      - 2.4.9 Results of examination
  - SECTION 3 ROPE DISCARD CRITERIA
    - 3.1 GENERAL
    - 3.2 WINDING ROPES, INCLUDING BALANCE ROPES
    - 3.3 GUIDE ROPES AND RUBBING ROPES
  - APPENDIX A - PRINCIPLES FOR OPERATING NDT EQUIPMENT
  - APPENDIX B - VISUAL ACUITY
  - APPENDIX C - TYPICAL WORK SHEET
  - APPENDIX D - USEFUL TECHNIQUES FOR DETERMINING AREA RELATIONSHIPS
  - APPENDIX E - METHOD FOR CLASSIFYING CORROSION AND WEAR
  - APPENDIX F - MEASURING THE DIAMETER OF ROPE

AS1657 Platforms, Stairways and Ladders.

- AS 1657-1992 FIXED PLATFORMS, WALKWAYS, STAIRWAYS AND LADDERS - DESIGN, CONSTRUCTION AND INSTALLATION
  - PREFACE
  - CONTENTS
  - SECTION 1 SCOPE AND GENERAL
  - SECTION 2 STRUCTURAL DESIGN, MATERIALS AND WELDING
  - SECTION 3 PLATFORMS, CONTINUOUS WALKWAYS, AND STEPS WITH LANDINGS
  - SECTION 4 STAIRWAYS
  - SECTION 5 FIXED LADDERS
  - APPENDIX A - TYPICAL COMPONENT DIMENSIONS AND SPACINGS FOR GUARDRAILING
  - APPENDIX B - TESTING OF GUARDRAIL POSTS
  - APPENDIX C - TESTING OF GUARDRAILS

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### 1.2.2.2 RECOMMENDED ADDITIONAL SPECIFIC DESIGN REQUIREMENTS

a) In addition to the Australian standards, specific guidance is provided in MDG33 for the following:
   a) Gearbox and drive design standards and duty requirements.
   b) Foundation capacity requirements including bolts are stipulated.
   c) Safety devices are nominated as required including:
      - Deadman controls
      - Emergency stops
      - Overtravel limits
      - Overspeed limits
      - Power loss
      - Slack rope
      - Rope speed
      - Conveyance direction
      - Brake pressures and position including wear, stuck valve, oil level and temperature
      - Derailment
      - Shaft flood alarm

## 1.3 LIFE CYCLE REQUIREMENTS AND CONSIDERATIONS IN THE PROPOSED CODE.

Comment:

a) The current code of practice does not provide ANY recognition or requirement for the safe use and management of winders. Comments regards what a driver must do are *extremely* limited. Eg: not be spoken during duty, person to ensure brakes are fully applied during boarding.

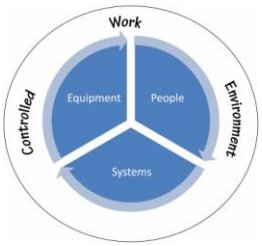
Life cycle management is the main criteria for mine winder safety.
There are many variants outlined in common law, our OH & S acts and regulations and standards.
Some of these include:

b) The Australian standard 4804 defines OHS management systems as:

A part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, process and resources for developing , implementing, achieving, reviewing and maintaining the OHS & S policy and so managing the OHS risks associated with the business or the organization.

c) A winder or any components safe use and performance is a combination of

DESIGN, COMMISSIONIING, OPERATION, MAINTENANCE, DECOMMISSION with review and monitoring processes incorporated ..

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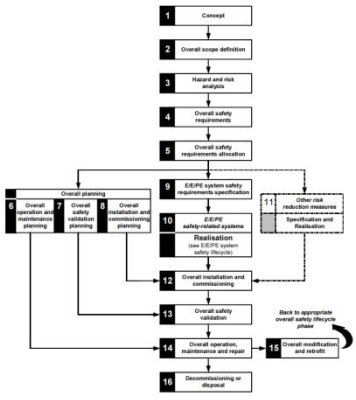
Together with considerations of the NERTNY of People, Equipment and Safe systems of work

| OH&S Act S8(1) | Nertney model |
|---|---|
| Duties of Employers | |
| (1) Employer must ensure the health, safety and welfare at work of all employees | |
| a) Any premises are safe | Work Environment |
| b) Plant or substance for use is safe | Fit for Purpose equipment |
| c) Systems of work are safe | Safe Systems of Work |
| d) Provide information, instruction, training and supervision at work | Competent People |

d) AS 61508 and AS62061 recognises and provides safety lifecycle requirements. The lifecycle provides a rigid framework of tasks, documentation and verifications to assist with repaeatable management processes.



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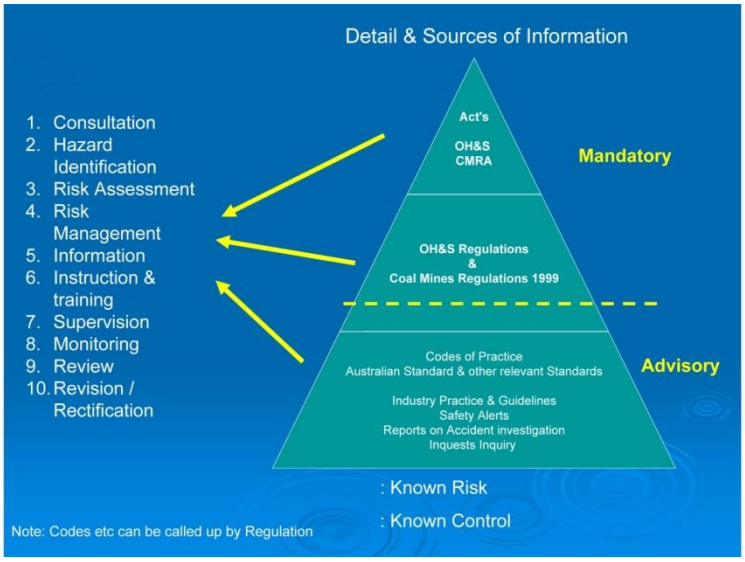
**It is imperative that there is prescriptive provision and ongoing account for winder management . The current NSW D.I.I registration and conditions thereof including safety audits for life cycle management must be commended and provided.**

e) The proposed document is not consistent with modern day OHS requirements, making no mention of same and should require a design risk assessment followed by operational/maintenance risk assessments in the relevant life cycle management section.




### 1.3.1.1 SUMMARY AND RECOMMENDATION OF LIFE CYCLE MANAGEMENT REQUIREMENTS

a) There is legal requirement to manage the design outcome.

b) The code should clearly state if complete life cycle considerations are outlined in the document and do so accordingly.

c) It is noted and commended that Part 1 of the draft MDG33 outlines such management detail.

d) It is noted and commended that the current NSW design registration conditions stipulate a mandatory 5 year safety audit on the operational use and management of the winder. This recognizes that design intent may diminish pending how an operator may use or manage the winder. The best designed winder will fail with dire consequences if not correctly used and maintained.

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e) Requirements for design and operational risk assessments need inclusion into the document.

## 1.4 BRAKING SYSTEMS.

Comment:
The current code of practice states little regards braking considerations. BRAKES ARE THE MOST CRITICAL COMPONENTS ON WINDERS DUE TO PEOPLE RIDING ON THEM and MUST STOP WHEN NEEDED !

The most catastrophic and significant incidents on records throughout the world illustrate brakes, including the electrical control system are the primary causes of such multiple deaths related to winders.

Safety circuits are also required to be installed to detect abnormal and unacceptable conditions and shut the winder down.

The following information is provided in the proposed code:

### 1.4.1 Number of braking systems

a) The code requires 2 or more brakes for other than a hoist. Note the definition of a hoist

*"A hoist is a single undivided drum winding engine, driven by a motor or engine having a capacity not exceeding 25 kilowatts"*

#### 1.4.1.1 RECOMMENDATION FOR NUMBER OF BRAKING SYSTEMS.

A man riding hoist requires the same backup protection regardless of it's size.

### 1.4.2 Brake system design and capacity

The current code provides to the following requirement:

a) *Friction winder brakes should have on the driving sheave of each friction winding engine 2 or more brakes and that each brake however applied, acts directly on the driving sheave, when applied by the means provided for use by the winding engine driver, is capable of producing a braking torque –*
   *(i) when transporting persons, of not less than 3 times, and*
   *(ii) when transporting rock or materials, of not less than 2 times,*

b) *Drum winding apparatus with two conveyances or a conveyance and counterweight – the brakes should be capable of holding the drum stationary, when the loads are balanced and the normal maximum torque is applied in either direction by the winding engine,*

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*Drum winding apparatus with one conveyance - the brakes should be capable of holding the drum stationary, when the fully loaded conveyance is halfway down the shaft, and the normal maximum downwards torque is applied by the engine,*

c) *The manager of a mine should ensure that, each part of each braking system, has a factor of safety of not less than 10, and screwed members in tension, the failure of which would render the brake inoperative, have a minimum factor of safety of not less than 15.*

#### 1.4.2.1 COMMENT AND RECOMMENDATION REGARDS BRAKE SYSTEM CAPACITIES

a) There is no nomination of brake paths and segregation of brake path components or channels to disseminate redundancy or Safety integrity following failure modes OR the capacity requirement for each path.
One brake path may provide 70% of the required brake torque, leaving the an inadequate brake path capacity in the event of the first one failing.
Braking during ore handling can almost be shown to have catastrophic consequences in the event of a brake failure given a total brake requirement of only 200% for the total system. (no 2 brakes ever provide exact same capacities)

b) Comments relating conveyance position in shaft and brake capacity requirements are irrelevant when discussing brake capacity requirements as the design and testing need to consider maximum load cases in any event.

c) Only single line components should provide the 10 and 15 FOS value requirements. Multiple failure points require complete consideration with respect to the maximum brake loads and likely failure modes.

### 1.4.3 Number of brake paths for man riding

The current code provides to the following requirement:

*a) If manwinding is to take place with a drum declutched other than in an emergency, the driven drum should be used for manwinding, and should be provided with two brakes on one disc*

*b) All hoist Drum brakes should be provided with at least one brake system that - acts directly on the hoist drum etc.*

*c) The brake locking device should comprise:*

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*a locking mechanism on the control linkage of the mechanical brake, which is engaged when that brake is full applied and prevents release of the brake, or a valve, which when operated, exhausts fluid supply pressure and, when the brake is fully applied, prevents its release.*

#### 1.4.3.1 COMMENT AND RECOMMENDATION FOR NUMBER OF BRAKE PATHS FOR MAN RIDING

a) Hoist drums may transport men.

b) The failure of the one brake path would provide a life threatening situation.

c) Man riding with only one disk brake, regardless of the number of calipers, in the event of a friction fault on that disc will be life threatening.

d) 2 brake paths are required in the event for any reason, one brake path fails (including contamination of the brake path) wherever men may ride in a shaft conveyance

e) There is no requirement that stipulates brakes to be “fail safe” in the event of loss of power and control circuit interactions.

### 1.4.4 Brake testing.

The current code provides to the following requirement:

*a) Brake holding capacity tests - Each brake on a winding engine or a hoist, should be applied for a period of 30 minutes, with a test load of 2 times the maximum static load normally hoisted for a winding engine (1.5 times for a hoist), from the lowest operating position in the shaft.*

#### 1.4.4.1 COMMENT AND RECOMMENDATION

a) Brake hold tests required for 30mins is pointless. If brake torque capacities are not met by the resisting load, slippage will occur immediately.

b) Brake testing is ideally done prior to use, should be related to the systems reliability and as minimum shown acceptable no more than the NSW current requirement of 7 days. Note that this frequency with current technologies, still find and prove brake capacity problems as most all sites from time to time. If the second brake were to fail in these periods, the winder would have no brakes with dire consequences.

### 1.4.5 Safety circuits.

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There are only 2 lines of information regards safety circuits in the document ie:

*"Safety circuits should not be dependent upon single line component functions essential to safety. Safety circuits should also be protected against electric shock".*

#### 1.4.5.1 SAFETY CIRCUIT COMMENTS AND RECOMMENDATIONS

The NSW DII have well developed electrical standards for primary and secondary safety circuits consistent with society expectations of today as follows:

a) The safety circuit definition provides that a circuit which detects abnormal conditions.
It shall be arranged so as to cause the winding apparatus to be brought to rest, prevent it from being moved and/or indicate the nature of the abnormal occurrence. A safety circuit shall not be dependent upon single line components for functions essential to safety and shall be protected against electrical faults.

b) The Primary Safety Circuit is a safety circuit containing all the safety critical devices of the powered winding system. An initiation or failure of any of the safety critical devices shall cause an emergency stop of the powered winding system.

c) The secondary safety circuit is designed to operate the service braking system and bring the EUC (conveyance) safely to rest. The Safety Integrity level of each safety function in the secondary safety circuit shall be level one.

### 1.4.6 Electrical braking.

The document suggests the following:
*"Electrical braking should be provided for all electrical winding apparatus where it is practicable to do so."*
*"Push button winding apparatus and new winding apparatus used for man winding, should have electrical braking designed so that in the event of an emergency trip, it is retained and applied automatically to compensate for any loss in the effectiveness of the mechanical brakes"*

#### 1.4.6.1 ELECTRIC BRAKING COMMENTS AND RECOMMENDATIONS.

The section appears specific to mechanical operated brakes only., Mechanical brakes should not be used in a dynamic situation and should rely on the electric control during braking.
The comments in this section need to cover all brake systems. These have been identified in the NSW mdg33.

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## 1.5 ROPE MANAGEMENT.

Comment:

a) There is only partial considerations provided for winding ropes in the code proposed.
b) Life cycle considerations are not fully dealt with , rather only partial consideration.
c) Frequency of examinations, detail of examinations, manufacture and design standards and monitoring requirements are barely dealt with.
d) Calculations for Factors of Safety on ropes provided in the proposed document utilize actual rope break values. The requirement under standards for this calculation requires the lessor of either the minimum breaking force for the rope when new or the actual breaking force.

### 1.5.1.1 RECOMMENDATION ROPE MANAGEMENT

The current NSW mdg26 including the referenced Australian and International standards such as ISO4309, AS3569 and AS1418 provide life cycle considerations including full examination, testing and discard criteria for mine winder ropes.

## 1.6 EFFECTIVENESS OF THE PROPOSED CODE

a) There are only a few "musts" throughout the document. The strongest example *" A winding engine must be suitable for the purpose for which it is used"*.

Comment.
When directed with a "must", the document then directs the owner to an area that is nominated as a "should", even to such areas as braking capacities that are already clearly under rated.

### 1.6.1.1 RECOMMENDATION FOR CODE EFFECTIVENESS.

Mandatory requirements be specific to areas and components. Areas that simply require "consideration" or "should do" are to be stated accordingly. These considered areas will be areas that are not recognised as safety critical and potentially life threatening.

## 1.7 EMBARKING AND DISEMBARKING FACILITIES

*a)* The code current requires "*Each responsible person at a mine, should ensure that provision is made at all working levels, for persons to embark and disembark from a shaft conveyance safely".*

Comment:
This requirement for "should" ensure has little meaning or capacity to be affected.

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It provides for the current industry standard, relying on soft barriers such as work procedures to manage worker safety between shaft entry areas. The hazard is extreme, that has already known hard controls available such as those outlined in MDG33 where locking mechanisms are required. The risk and man riding equipment is the same in both cases and requires hard barrier control.

#### 1.7.1.1 RECOMMENDATION FOR EMBARKING AND DISEMBARKING FACILITIES

Hard barriers required to manage persons safety when entering conveyances in a shaft. The current NSW MDG33 and MDG2005 require this and should be maintained.

## 1.8 COMPETENCY REQUIREMENTS.

The proposed code ineffectively deals with competency requirements for operators. Ie:
*"A person should not operate a hoist at a mine, and the manager of a mine should not permit a person to operate a hoist at the mine, unless the manager is satisfied that the person is competent to operate that hoist"*

*Winding engine drivers to have medical examinations-"This section does not apply to person who is exempted from holding a winding engine driver's certificate, or the operator of a hoist."*

#### 1.8.1.1 COMPETENCY COMMENTS AND RECOMMENDATIONS

a) Competencies are not established by authority from the manager. Competency needs to be shown following training and assessment relating use of the winder.
b) Training and assessment need to relate to those that operate and maintain the winder.

## 1.9 COMMUNICATION SYSTEMS.

Man riding presents the largest risk for both manual and automatic mine winders.
There appear only a few words that establish minimum communication requirements during this man riding condition. Ie: *"Communication by voice restricted - A person should not communicate signals by word of mouth, up or down any shaft, except through a telephone properly fitted and isolated in a compartment, that is not used for hoisting, or by radio or radio telephone installed for that purpose".*

#### 1.9.1.1 COMMUNICATION SYSTEM COMMENT AND RECOMMENDATION.

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Man riding on both automatic and manual winders should require a separate confirmation system following request for travel. This may be electronic or manual that supports the initial request and as a minimum provides independent ability for the system to be shut down if not confirmed.