ISO 19426-4:2018 (E)

Structures for mine shafts — Part 4: Conveyances

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols

5 Materials

5.1 Steel
5.1.1 High strength steel grades
5.1.2 Cold temperature operation
5.2 Aluminium alloys

6 Nominal operating loads

7 General operating loads

7.1 Permanent loads
7.2 Vertical imposed loads due to holding devices
7.2.1 Holding device engagement load
7.2.2 Holding devices securing load
7.3 Lateral imposed loads
7.3.1 Fixed guide systems in vertical shafts
7.3.2 Rope guide systems
7.3.3 Decline shaft conveyance wheel loads
7.4 Winder system loads
7.4.1 Acceleration/deceleration load
7.4.2 Trip-out load
7.4.3 Tail-rope load
7.4.4 Vertical friction load
7.5 Roof loads

8 Personnel winding loads

8.1 Standing personnel load
8.2 Seated personnel load
8.3 Loading of cages
8.4 Loading of cages in decline shafts
8.5 Dogging system load

9 Material and equipment winding loads

9.1 Floor loads
9.1.1 Static load
9.1.2 Impact loads
9.1.2.1 Rolling stock load
9.1.2.2 Rubber-tyred, self-propelled vehicle load
9.1.2.3 Crawler-mounted, self-propelled vehicle load
9.1.2.4 Other material and equipment loads
9.2 Underslung loads or trailing loads

10 Rock winding loads

10.1 Skip loads
10.1.1 General
10.1.2 Static rock loads
10.1.3 Bridle and top transom loads during filling
10.1.4 Reference rock pressure
10.1.5 Pressure during filling or travelling in the shaft
10.1.5.1 Pressure on skip bottom (p1)
10.1.5.2 Side pressure (p2)
10.1.6 Pressures during emptying
10.1.7 Load on tipping rollers
10.1.8 Skip return-stop loads
10.2 Kibble loads
10.2.1 Static rock or slurry loads
10.2.2 Reference rock or slurry pressure
10.2.3 Pressure during filling
10.2.3.1 Pressure on kibble bottom (p1)
10.2.3.2 Side pressure (p2)
10.2.4 Pressures during emptying
10.2.5 Heavy kibble payloads

11 Emergency loads

11.1 Rope emergency load
11.1.1 Permanent operating conveyances with fixed rope winders
11.1.2 Permanent operating conveyances with friction winders
11.1.3 Temporary equipping, maintenance and inspection conveyances
11.1.4 Slung equipment and conveyances
11.1.5 Kibbles and kibble cross-heads
11.2 Emergency drop-back loads
11.2.1 General
11.2.2 All permanent conveyances
11.2.3 Kibbles and kibble cross-heads
11.3 Roof impact loads
11.4 Skip loads
11.4.1 General
11.4.2 Reference rock pressure
11.4.3 Pressure during filling or travelling in the shaft
11.4.3.1 Pressure on skip bottom (p1)
11.4.3.2 Side pressure (p2)
11.4.3.3 Single rock impact (Ri, Rk) during filling
11.5 Emergency stopping device loads
11.5.1 Overspeed device
11.6 Application of emergency loads

12 Design procedures

12.1 Design loads
12.2 Design codes
12.3 Design for emergency loads
12.3.1 Steel components
12.3.2 Aluminium components
12.3.3 Special considerations
12.3.3.1 Conveyance roofs
12.4 Fatigue

13 Construction requirements

13.1 General
13.2 Confirmation of design by testing
13.2.1 Testing of operating mechanisms
13.3 Construction tolerances

Annex A (informative) Load factors and load combinations

A.1 General
A.2 Operating conditions
A.2.1 Partial load factors
A.2.2 Load combinations

A.2.3 Fatigue design loads
A.3 Emergency conditions
A.4 Conveyance installation

Annex B (informative) Examples of tipping roller and skip return-stop loads

B.1 Tipping roller load
B.1.1 Vertical shafts
B.1.2 Decline shafts
B.2 Skip return stop loads — Vertical shafts and decline shafts

Page count: 29