# ISO 10896-2:2016-02 (E)

## Rough-terrain trucks - Safety requirements and verification - Part 2: Slewing trucks

## Contents

Page


Foreword ..... vi

Introduction ..... vii

1 Scope ..... 1

2 Normative references ..... 2

3 Terms and definitions ..... 3

4 Requirements ..... 8
4.1 General ..... 8
4.1.1 Sharp edges and acute angles ..... 8
4.1.2 Stored energy components ..... 8
4.1.3 Boom extension and angle indicators ..... 8
4.2 Starting/moving ..... 8
4.2.1 Unauthorized starting ..... 8
4.2.2 Unintended movement ..... 9
4.2.3 Uncontrolled motion ..... 9
4.2.4 Powered travel movement ..... 9
4.2.5 Non-activation of the parking brake ..... 9
4.2.6 Inching pedal ..... 9
4.3 Brakes ..... 9
4.3.1 General ..... 9
4.3.2 Failure of energy supply ..... 9
4.4 Electrical and electronic systems ..... 10
4.4.1 General ..... 10
4.4.2 Degree of protection ..... 10
4.4.3 Electrical connections ..... 10
4.4.4 Over-current protective devices ..... 10
4.4.5 Batteries ..... 10
4.4.6 Battery disconnection ..... 10
4.5 Controls ..... 11
4.5.1 General ..... 11
4.5.2 Differential locking ..... 11
4.5.3 Steering controls ..... 12
4.5.4 Load-handling controls ..... 13
4.5.5 Multi-function controls ..... 13
4.5.6 Stabilizing device control ..... 13
4.5.7 Sway/levelling control ..... 14
4.5.8 Axle oscillation locking ..... 14
4.5.9 Auxiliary hydraulic control ..... 14
4.6 Power systems and accessories ..... 14
4.6.1 Exhaust systems ..... 14
4.6.2 Cooling systems ..... 14
4.6.3 Tanks and pressure vessels ..... 14
4.7 Stabilizing devices ..... 15
4.8 Design requirements for maintenance purposes ..... 15
4.8.1 General ..... 15
4.8.2 Tiltable cab support device ..... 16
4.9 Systems for lifting, tilting and reaching ..... 16
4.9.1 Chains and wire ropes ..... 16

4.9.2 Hydraulic system ... 17
4.9.3 Maximum load-lowering speed ... 17
4.9.4 Limitation of stroke ... 17
4.9.5 Fork arms, attachments, and quick couplers ... 18
4.9.6 Slewing brake ... 18
4.10 Normal operating position ... 18

4.10.1 General requirements ... 18
4.10.2 Storage of operator's manual ... 18
4.10.3 Hot parts ... 18
4.10.4 Pipes and hoses ... 18
4.10.5 Normal operating position equipped with enclosed cab ... 18
4.10.6 Operator's seat ... 20
4.10.7 Control panels and symbols on displays ... 21
4.11 Operator access ... 22
4.11.1 General requirements ... 22
4.11.2 Enclosed cab openings ... 22
4.12 Protective measures and devices ... 23
4.12.1 Hot parts ... 23
4.12.2 Protection against crushing, shearing, and trapping ... 23
4.12.3 Guards ... 23
4.12.4 Safety signs ... 23
4.12.5 Engine compartment ... 23
4.12.6 Fenders ... 23
4.12.7 Roll-over protective structures (ROPS) and falling object protective structures (FOPS) ... 23
4.12.8 Tiltable cab ... 24
4.12.9 Audible warning devices ... 24
4.13 Stability ... 24
4.14 Visibility ... 24
4.15 External lighting devices ... 24
4.16 Fire protection ... 24
4.16.1 Fire resistance ... 24
4.16.2 Fire extinguisher ... 24
4.17 Retrieval, transportation, lifting, and towing ... 24
4.17.1 General ... 24
4.17.2 Retrieval ... 24
4.17.3 Tie-down ... 25
4.17.4 Lifting ... 25
4.17.5 Towing ... 25
4.17.6 Transportation ... 25
4.18 Noise ... 25
4.19 Structural calculations ... 25
4.19.1 General ... 25
4.19.2 Loads and forces ... 25
4.19.3 Calculations ... 27

5 Verification of requirements and safety measures ... 28
5.1 General ... 28
5.2 Functional verification ... 28
5.3 Structural verification ... 28
5.3.1 Test loads ... 28
5.3.2 Static test ... 29
5.3.3 Dynamic testing ... 29
5.4 Maximum load-lowering speed verification ... 30
5.5 Load holding ... 30

6 Information for use ... 30
6.1 General ... 30
6.2 Operator's and maintenance manuals ... 30
6.3 Marking ... 32
6.4 Load charts ... 33
6.4.1 Trucks with load-carrying attachments ... 33

6.4.2 Trucks with non-load-carrying attachments ..... 34

Annex A (informative) List of significant hazards ..... 35

Annex B (normative) Attachments and quick couplers ..... 40

Annex C (informative) Consistency of direction of motion for load-handling controls ..... 43

Annex D (informative) Examples of regular and occasional loads ..... 45

Bibliography ..... 46