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Application flyer

Ladder Testing acc. to EN 131

Calmar pro

zertifiziert nach DIN EN ISO 9001
TÜV CERT
Zert. Nr. 08/100/9044/3

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Occupational safety begins with the reliability of work equipment. Whether closing doors, limit switches or safety fences – if the technology fails, there will be danger to life. Climbing and access material, especially ladders, are also subject to testing standards in order to guarantee their quality and safety.

Ladder testing according to EN 131

The European standard EN 131 is used for the testing of ladders. This standard was extensively revised and expanded to include part 1-3 in 2018, which place stricter requirements on the testing standard of ladders and classify ladders into the following two classes: Ladders for the commercial ("professional") and private sector ("non-professional"). Among other things, the extensions stipulate, that ladders with a height of 3,000 mm or more must be equipped with a stand extension. In addition to the tests for spar strength and torsion for single ladders, the extensions 1-3 also regulate torsion tests and base slip tests for stepladders as well as continuous loading tests.

To ensure occupational safety, continuous loading tests are absolutely necessary for ladders for both commercial and private use. For the test, the ladder load is simulated by alternately loading the top step/rungs and the middle studs/rungs of the ladder with 1,500N. For the private sector 10,000 cycles have to be repeated, for the industrial sector 50,000 cycles. The primary objective of the continuous loading tests of ladders is non-destructive testing, i.e. no damage shall occur.

Testing system from Hegewald & Peschke

Hegewald & Peschke has developed a force-controlled testing system which optimally meets the requirements of the EN 131 standard and its extensions. The vertical testing of the ladders is carried out with two pneumatic test cylinders. In concrete terms, the pneumatic test axis are equipped with "shoe sole-like" load pads. Each test cylinder has an own controller mounted in the immediate proximity, which is operated via a CAN bus signal from a PC and can be utilized in synchronization with other test axis.

Since the proportional valve is located directly in the control unit at the test cylinder, the test system works in a resource-saving manner and the compressed air consumption is greatly reduced. Of course, this effect is enhanced by the extreme hose lengths on the testing system.

Power and compressed air are connected to a central supply terminal and from there distributed to all test axis. The supply terminal takes over the implementation of the CAN protocol to USB and thus simultaneously represents the freely positionable control station with PC. The individual test axis have an identifier and can be connected and disconnected at the supply terminal with quick-release couplings.

In order to guarantee maximum work safety, the test system is equipped with a standard central emergency stop device, which allows all test axis to be switched off simultaneously in the event of danger.

Fig. 1: Load pad on a pneumatic test axis during continuous loading test according to EN 131

Special features

The frame of the test system consists of via cable height-adjustable transverse profiles and two side profiles which accommodate a cross profile for mounting the test cylinder for the upper stage of the test specimen. In addition, the test system is equipped with a second via cable height-adjustable transverse profile for mounting the test cylinder for the middle stage of the test specimen. The test cylinder can be adjusted both on the frame and on the transverse profile laterally along the transverse profile. In addition, the mounting brackets allow an exact angle adjustment of the test cylinder.

The height adjustment of the cross profile and the frame is carried out by manually operated cable winches. There are clamping levers at the contact points to the test frame, which have to be fixed before the test and need to be released for height adjustment.

This means, that the test axis can be positioned in a user-friendly manner according to the test task and beyond ensures safe operation,

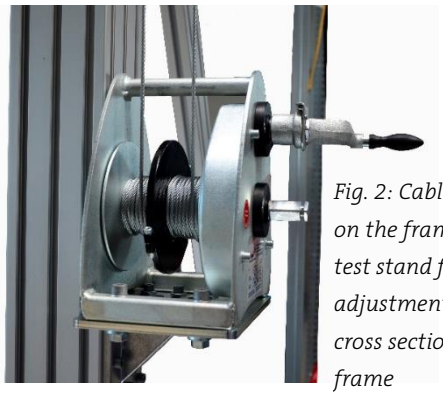

Fig. 2: Cable winch on the frame of the test stand for height-adjustment of the cross section and the frame

preventing the height-adjustable cross profiles from free fall in case of operating errors.

A further advantage of the test system is the closed-loop control regulating mechanism. This guarantees that the target test loads can be reproducibly applied. As an option, a displacement measuring system can be retrofitted in addition to the load cell. Thus, especially for further development of ladders, hysteresis curves can be recorded displaying force vs. displacement and aging effects can be characterized.

Fig. 3: Test cylinder, front view (left) and view on cross profile (right)