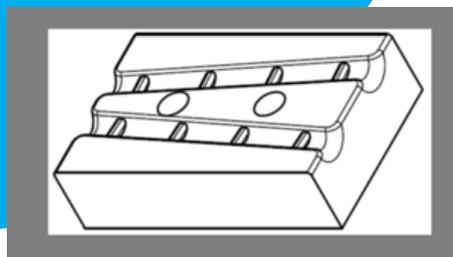


Rope end connection for high modular fiber ropes – secure fastening of ropes to structures, their adjustment and release

This innovative rope end connection makes it possible to connect a high modular fiber rope to a structure in a simple and safe way, and also to release it again. It is also possible to adjust the rope length on site or to quickly replace ropes or connectors. Thanks to an adaptable, simple design - in combination with additive manufacturing in particular - an almost ideal power transmission is achieved and at the same time an inadmissibly high clamping force is avoided. Thanks to rapid prototyping, individual solutions for the most diverse designs can be realized.

- Simple and low-cost production and scaling through additive manufacturing
- Flexible handling as well as simple release and adjustment
- Secure fastenings for various rope types
- No damage to the rope, both rope and clamp can be reused



Fields of application

High modular fiber ropes are becoming increasingly popular in fields such as lifting and cranes as they have many benefits compared to conventional steel rope for certain applications (light weight, tight bend angles, can be used under water). The new clamp connection can significantly support this development. This technology could be particularly interesting in the field of hoists as a precise matching of rope lengths is decisive here.

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Service

Technologie-Lizenz-Büro GmbH manages inventions until they are marketable and offers companies opportunities for license and collaboration agreements.

Background

In a wide range of technical applications, ropes need to be fastened to structures and removed again. Flexible solutions already exist for wire ropes; however, they have not been available in the field of high modular fiber ropes.

Problem

Connection elements have so far been permanently cast onto fiber ropes or directly spliced in by the ropemaker in order to guarantee sufficient stability of the connection.

This process of pre-assembly is not very flexible, especially when ropes or rope drives need to be exchanged or adjusted quickly on site, for example in an elevator or a hoist. Inserting a rope is also problematic in some systems due to the previously mounted end. In addition, the connections cannot usually be removed without being destroyed at the same time, i.e. they cannot be used again.

Solution

At the Institut of Mechanical Handling and Logistics (IFT) at the Universität Stuttgart, a flexible clamping device for rope ends has now been developed.

This is particularly suitable for high modular fiber ropes, but also other types of rope can be securely fastened this way.

The connection consists of two clamping half-shells which end in a bearing eye (or similar). Both halves can be joined to form a rope end connection (clamp connector) using a screw connection. The bearing eye can be directly integrated, but can also be produced separately and added to the connection.

To mount, the rope is placed around the bearing eye and between the two half-shells which are equipped with matching grooves. The half-shells are then screwed together so that an adjustable clamp force thus comes into effect. The constructive adjustment of groove depth and height of cross ribs prevent an impermissibly strong clamp force so that handling / assembly is simple, i.e. not prone to errors. The rope runs through this clamp without being damaged and can reliably transfer the applied forces to the eye, i.e. the structure.

A design which is adapted to the rope in this way can be realized at low cost using a modern additive procedure without postprocessing and can thus be effortlessly scaled.

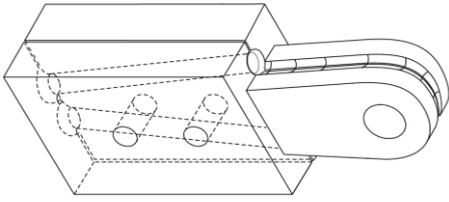


Fig. 1 (left): Isometric depiction of an example clamp connection without rope consisting of two halves with integrated bearing eye and two through bores for screwing together.

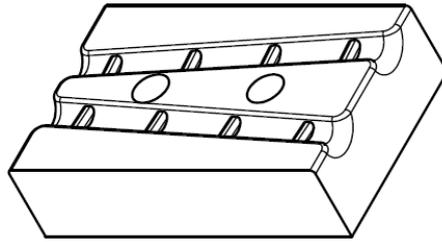


Fig. 2 (right): Isometric depiction of an example clamp half-shell with interior, rope-protective grooves and cross-rib [Figures: University of Stuttgart].

Publication and links

More information on the subject of “ROPE TECHNOLOGY” from the Institute of Mechanical Handling and Logistics:

<https://www.ift.uni-stuttgart.de/institut/pdfs/Broschuere-Seiltechnologie-dt.pdf>

<https://digital.foerdern-und-heben.de/f-h-fordern-und-heben-7-8-2022/67097477>, Seite 34,35,36