Correction & ammendment to ERCA safety warning 1 / 2011: Wire Rope Terminations

Please note: *ERCA safety warning 1 / 2011 has been corrected (see note B.2 below) and ammended (see B.3 below) on 2011-08-29. Please have a look on page 3 where the corrections were inserted. Henceforth, only this corrected version will describe the process correctly . This document replaces the former document published on 2011-01-23.*

We have noticed that there was conflicting advice in our Safety Warning 1/2011 that relate to torque settings and the positioning of wire rope grips. We have investigated the reasons for the discrepancies and can report as follows:

A) The version of EN13411-5 revised in 2003 and 2008 may have been inconsistently or incompletely incorporated into the installation manual of manufacturers.

B) An old recommendation of the Technical Committee for Metal and Surface Treatment on the use of wire rope grips with spiral ropes still exists, even though this recommendation was rendered invalid by the new version of EN13411-5 several years ago.

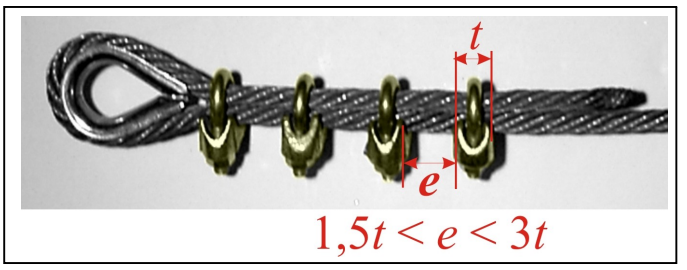
B.1 Current status

We can confirm that only EN13411-5 in the latest 2009-02 version is the directive for the application of wire rope grips. The installation manuals of manufacturers should be based on this version. If you notice a significant discrepancy between the data in the standard and the manufacturer's instructions, you should ask your manufacturer / supplier whether the statements are consistent with the latest version.

B.2 Corrections

a) Torque *(please see page 3 as well)*
We need to revise the sample specification made in our ERCA Warning 1/2011 relating to the torque setting for a 10-mm diameter wire rope (type: 6x19+1SE). The correct torque setting (for grips compliant with EN13411-5, Appendix A) that is required within EN13411-5 is 9 Nm and not the erroneously printed value of 9.9 Nm. For all data relating to the correct application of wire rope grips please refer to the standard or the installation manual of the manufacturer. This data varies with the cable diameter.

b) Grip spacing *(please see page 3 as well)*
The spacing "*e*" between the wire rope grips should now be at least 1.5 *t* and not more than 3 *t*, where *t* is the width of the clamping jaw.



B.3 Ammendment: Exclusion of spiral ropes

The use of U-bolt wire rope grips with spiral ropes (for rope types & rope classes, see EN12385-2 :2008-06, section 3.6 et seq) was prohibited (see EN13411-5:2003-05, page 4). The name of the rope class of spiral ropes is usually indicated as "1x ...", e.g. "1x19", "1x37", etc.

ERCA Safety Commission – Safety Warning 1/2011
Corrected version: 2011-08-29. Changes marked in red color.
The aim of this safety warning from the ERCA is to prevent accidents and it will be sent to all members in the near future. We have endeavoured to provide an objective portrayal of the events and causes of the incident without a detailed inquiry being carried out.
Please send relevant comments and questions to: sicherheit@erca.cc

1/2011: Ropes courses closed ever more frequently due to construction faults
Certification criteria not met in accordance with EN 15567-1 and ERCA inspection standards

From reports by inspection bodies and inquiries by operators, we can deduce that the ropes course construction varies widely in terms of quality. One ropes course which did not meet basic requirements of EN 15567-1 or ERCA standards had safety faults that resulted in it being shut down.

In the interest of accident prevention and better orientation for operators of ropes courses, we would like to describe here some of the most basic safety requirements. Even though this collection is incomplete, it may help to better assess the design of ropes courses.

Rope end connections and fastening methods

a. Wire rope terminations

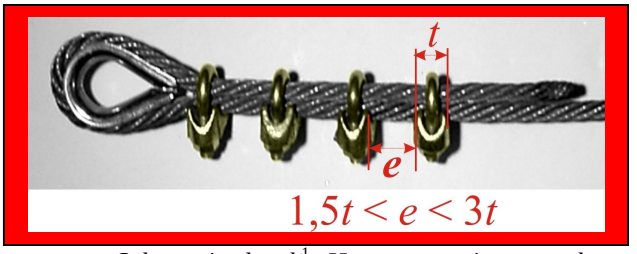
As already described in our alert of 1/2006 and referred to in the norms and standards only certain terminations of wire ropes is permitted.

Wire rope (safety) clamps:
Rope end terminations using wire rope clamps must be made in accordance with EN 13411-5 (cf. Ropes Course Standard EN 15567-1 (paragraph 2. Normative References) as well as ERCA Standards -V- C.5.4).
EN 13411-5 (formerly DIN 1142) describes precisely the production process, materials and surface treatment as well as how to use the clamps. The approved rope diameter and the manufacturer ID are provided on the clamping jaw of these clamps (e.g. XB). Both the clamping bracket and the nuts of these clamps have to be *yellow chromated*, and the clamping jaw has to be electrogalvanised and chromated.
These features differ sharply from other types of rope clamps, and anyone can verify them with a visual check.
Other wire rope clamps, such as the type in DIN 741 were withdrawn from the market years ago, are specifically not safety clamps and should therefore only be used in “non critical applications” (e.g. bracing garden fences and suspending office lamps).

Wire rope clamp terminations which have a critical application, should be consistent with the requirements of EN 13411-5.

The number of clamps to be used, and the torque of the screw fastening, will depend on the rope diameter. A 10-mm steel rope of the 6x19+1SE design, for example, requires at least four rope clamps in accordance with EN 13411-5. According to the standards table, the nuts must be tightened with a torque of 9 Nm ~~9.9 Nm~~. This standard stipulates other requirements for how to use and inspect rope clamps, which is why installation should only be performed by competent, skilled personnel.

The following diagram illustrates, for example, the positioning of such wire rope clamps, using as an example a 10-mm thick wire rope of the 6x19+1SE design:



Schematic sketch[1]*: How to use wire rope clamps (following EN 13411-5)*
Sketch coorected on 2011-08-29

Additionally, it has proved worthwhile to retighten the nuts at regular test intervals, to make visual inspections and to check the clamps for any corrosion damage. Examination is important in particular:

- About 12 to 24 hours after the initial installation and before any loading
- about one week after the initial installation, when several rounds with stressing have taken place
- about one month after the initial installation, when further rounds and stressing have taken place
- whenever some external manipulation cannot be ruled out
- for connections subjected to great loading (i.e. for bottom elements in ropes courses)
- where there are effects from severe weather conditions (e.g. temperature etc)

<u>Ferrule secured terminations</u>

Similar rules and inspection methods apply to ferrule secured terminations, the scope of which does not allow these to be presented in detail here. It is important to mention that these terminations have to be made in accordance with 13411-3. These standards also require that a manufacturer ID be included on the ferrule.

Ferrule connections are being made more and more often by construction firms on site, using small mobile compression tools. This is permissible if a licensed testing institute has issued a test certificate for such tools.

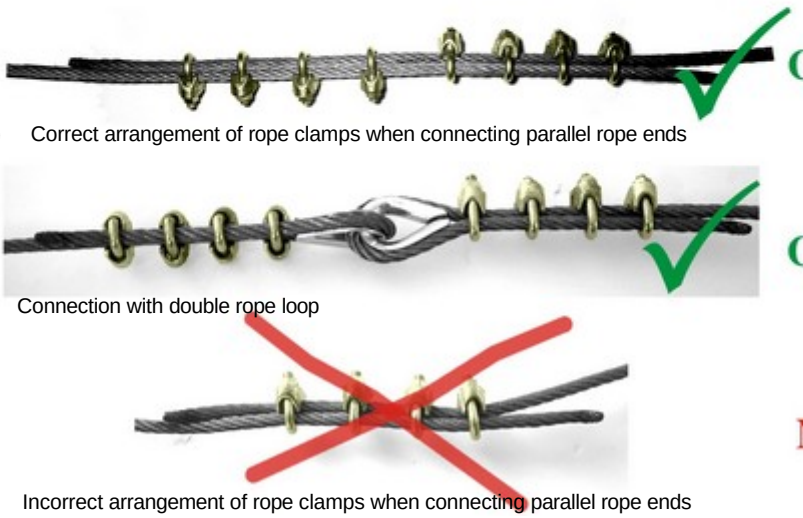
The certificate for proper compression is part of the documentation which construction firms must provide to customers.

[1] This sketch only serves as an example illustration. The number of clamps and the torque of the nuts must be adjusted depending on the diameter and type of the wire rope (cf. top of page 3).

b. Fastening methods and connecting ropes

Steel ropes are susceptible to bending and creasing stresses and must only be executed with appropriate fastening methods. When eyes are made, thimbles must be used, to keep the rope in a sufficiently large radius, thereby preventing kinking. Avoid wire ropes from moving (unfixed) over one other, rubbing together or creasing.

Editor's Note: Image annotation below translated from EN 15567-1:2007 (D)



a) Correct arrangement of rope clamps when connecting parallel rope ends

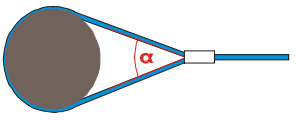
b) Connection with double rope loop

c) Incorrect arrangement of rope clamps when connecting parallel rope ends

Schematic sketch[2]: following EN 15567-1:2007 (D)

When fastening by wrapping around a mast or tree, ensure the wire rope runs in a large radius around the attachment point and that the rope enters the clamp connection at as acute an angle as practicably possible.

Editor's Note: Image annotation below translated from EN 15567-1:2007 (D)
"With wire rope terminations that run around trees or poles, the effects of the angle on the loop have to be taken into account. An angle of α=60° is recommended (see Figure 3)." In case of an angle >60° (e.g. using big trees) please see recommendations at EN 15567-1 (chapter 4.2.4).



Schematic sketch: ERCA

[2] This sketch only serves as an example illustration. The number of clamps and the torque of the nuts must be adjusted depending on the diameter and type of the wire rope (cf. top of page 3).