

 **O.I.T.A.F.**  
Work-Committee No II  
Characteristics and Inspection of Ropes

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## Lubrication and Re-lubrication




**Bonjour**  
**Buon giorno**  
**Good morning**  
**Guten Morgen**


**Full locked spiral ropes / track ropes**

Name: Bruno Longatti Number of slide 1

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## Lubrication and Re-lubrication




**Have a look behind the curtain of the ropeways and their ropes**


The guests are happy and enjoy the excursion

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## Lubrication and Re-lubrication




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## Lubrication and Re-lubrication



**It is unsafe and very expensive!**

We do not feel happy and safe about this view!

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## Lubrication and Re-lubrication



We do not feel happy and safe about this view!

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## Lubrication and Re-lubrication

### Topics

- ▲ Introduction, Differences to stranded ropes
- ▲ Lubrication (third body, manufacturing)
- ▲ Re-lubrication
- ▲ Specific rope areas
- ▲ Hazards

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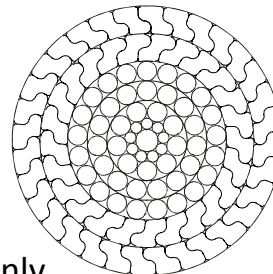
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## Introduction

### Differences to stranded ropes

- ▲ All wires are bright
- ▲ Locked ropes have z-shaped wires
- ▲ Ropes don't move, the cabins run only over a section of the hole rope length
- ▲ Different fatigue over the rope length
- ▲ Maintenance work only on the outer layer
- ▲ A repair peace isn't possible, only substitution of single wires



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## Targets for lubrication

### A steel wire rope needs to be lubricated:

- ▲ to prolong its useful service life
- ▲ reducing the coefficient of friction between the wires and the layers
- ▲ increasing the corrosion protection
- ▲ reducing the rate of development of the numbers of broken wires

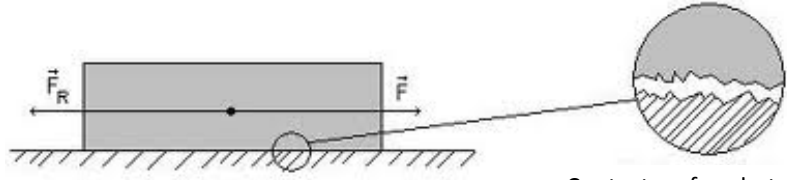
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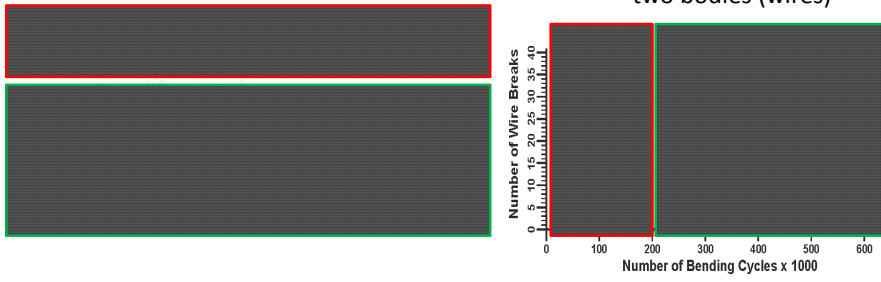
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### Lubrication (Third body)



Contact surface between two bodies (wires)



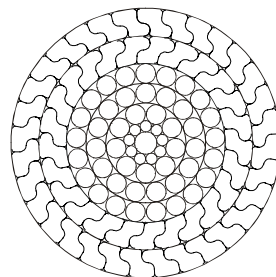
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### Manufacturer's lubrication



full filling  
of  
each wire layer

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## Hazards

### Soiling of the installation and the guests



**Track rope cleaning**  
Remove the lubricant on  
the tight rope before the  
installation goes in use!

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## Why re-lubricate


- ▲ the bright wires in the outer layer must be protected against corrosion.
  - ➡ to build up a protective patina!
- ▲ lubricant is consumed in- and outside the rope and must be supplemented periodically once again!
- ▲ increased friction and corrosion is to prevent at contact points between rope and guiding element (saddle profile etc.)!

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## Attention



➤ **too much lubricant!**

(Pkt. 5.2.1 EN 12927-6)

«Ropes shall be discarded if their condition cannot, or can no longer, be assessed with the current methods of inspection.»

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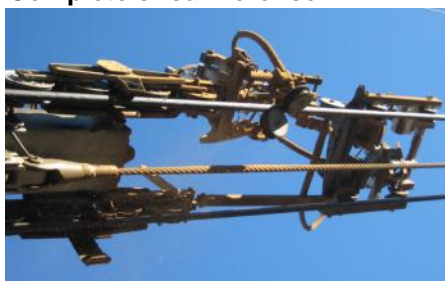
## Only clean ropes are to re-lubricate

With rotating brushes

Partial



Complete circumference



**Attention**

- ▲ No mechanical damages on the wire surface.
- ▲ No heat that influence a reduction of the strength

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## How to re-lubricate

### In the stations



Lubricant with solvent

- ▲ spraying
- ▲ brushing



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## How to re-lubricate

### On the free rope length




Lubricant with solvent  
or  
oil


- ▲ spraying
- ▲ dropping

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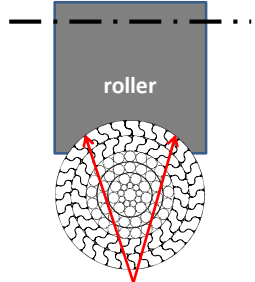
## How to re-lubricate

### Spraying tool

Lubricant is spraying with spray nozzles on the rope surface.




**Lubricant with solvent**




**Attention**  
No or only a little lubricant on the contact surface with the roller

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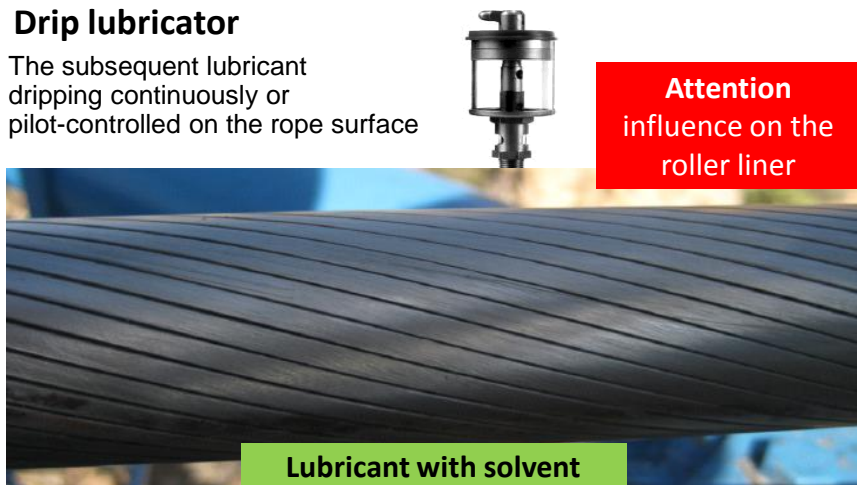
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## How to re-lubricate

### Drip lubricator

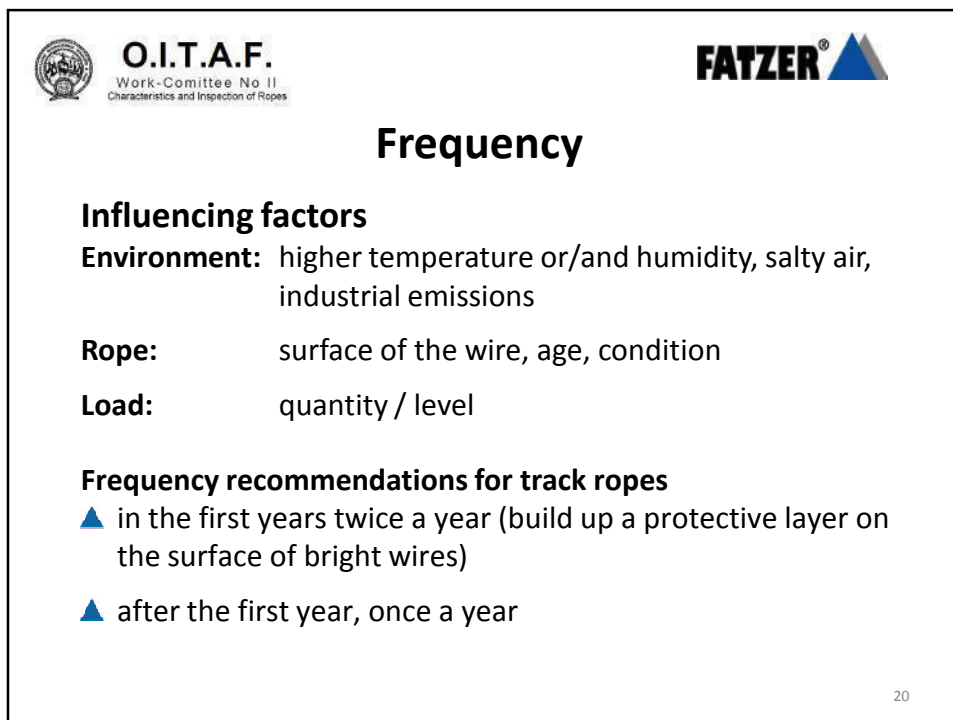
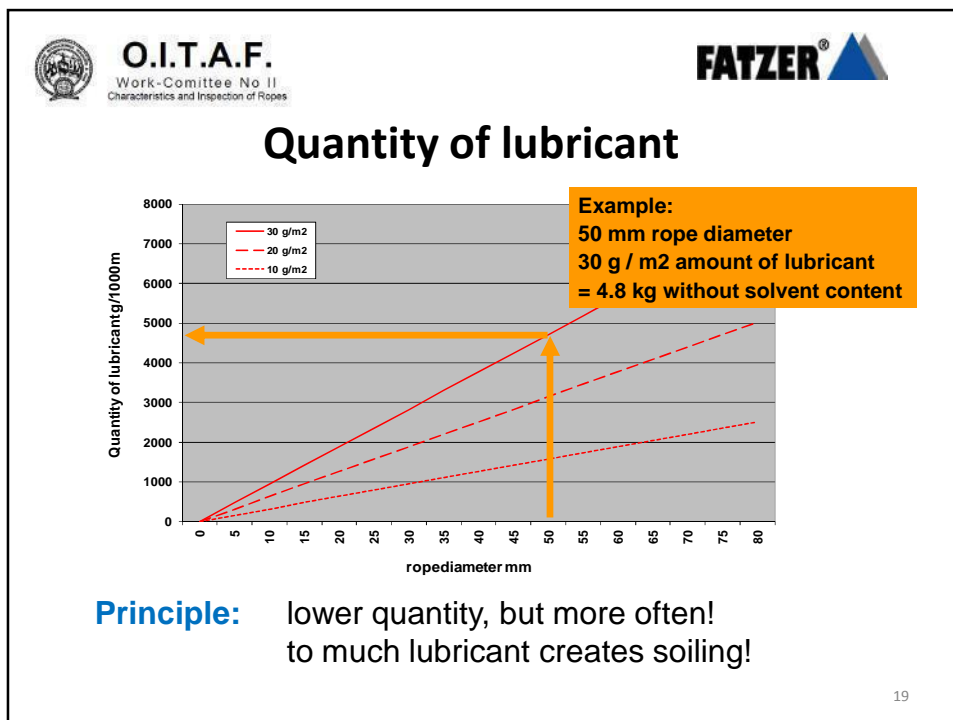
The subsequent lubricant dripping continuously or pilot-controlled on the rope surface



**Lubricant with solvent or oil**

**Attention**  
influence on the roller liner

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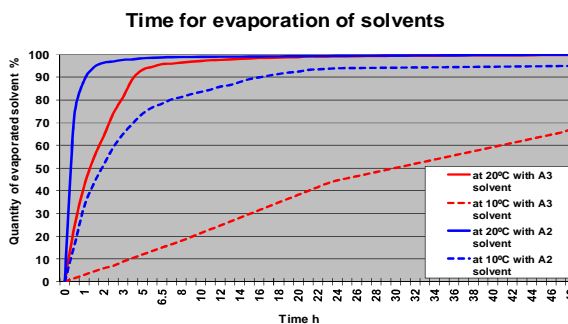


## How to re-lubricate

### Conditions

Re-Lubrication should be carried out only on dry ropes and by warm weather.

**Attention:**  
If the subsequent lubricant with solvent is resolved, the operation may be not immediately resumed after a rope lubrication!



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## Safety precautions

**Employees, who are carrying out the re-lubrication needs:**

- ▲ safety belts, warm wear, helmet, hard-toed shoes, glasses, gloves, etc.
- ▲ person who monitored the route and can stop the cabin at any time!
- ▲ ....



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## Lubrication of specific rope areas

### Bollard




➤ Moisture = collapse the liners + corrosion

**Necessary:**


- ▲ rope maintenance (conservation)
- ▲ weather protection
- ▲ accessibility of appropriate inspections




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## Lubrication of specific rope areas



no slip-stick!


Saddle 1


Reduction of the friction between the rope and the saddle profile



Fit support +  
No constant moisture!

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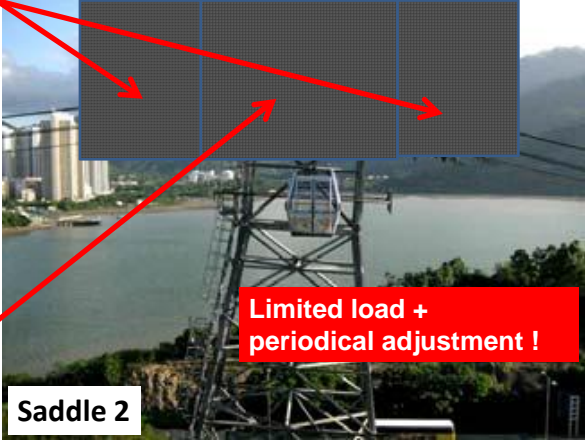
### Lubrication of specific rope areas

**Reverse bending's with restricted movement of the outer wires.**


**Ovalisation of the rope on the basis of increased shear force of the rollers.**


**Limited load + periodical adjustment !**

**Saddle 2**



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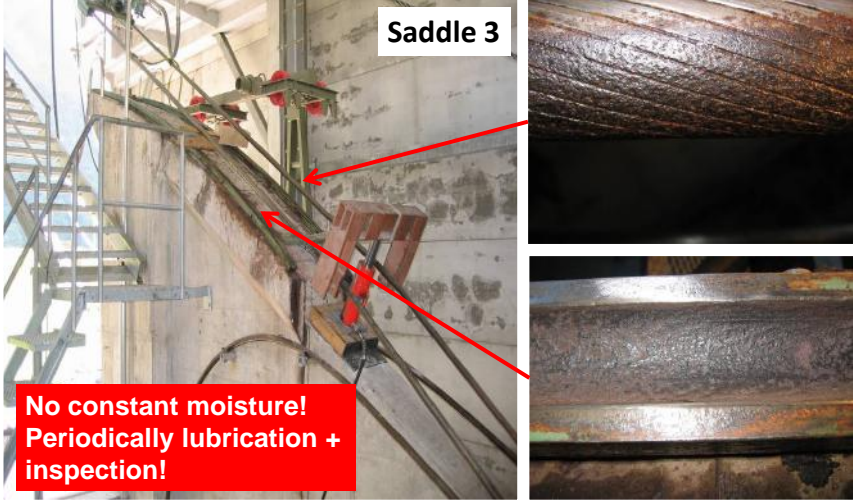
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### Lubrication of specific rope areas

**Saddle 3**

**No constant moisture!  
Periodically lubrication + inspection!**



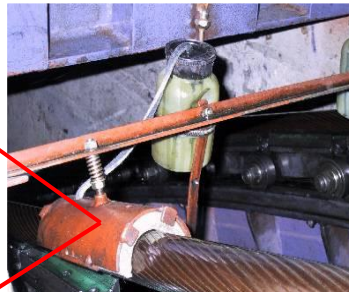
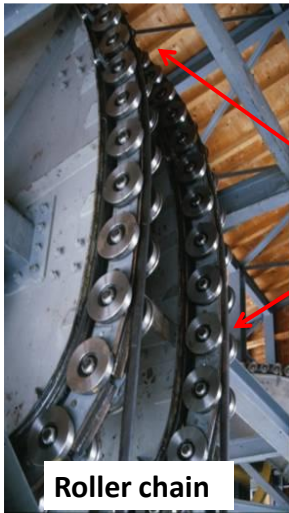
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### Lubrication of specific rope areas



**Attention**

- ▲ Permanent lubrication on bending points

**Note:** The lubricant must have good penetrate properties.

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### Hazards

**Track rope break**

- No solid lubricant



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## Conclusion

- ▲ We have different fatigue over the rope length
  - ▲ We need different type of lubricant
  - ▲ If one section of the rope achieve the discard criteria's, the track rope has to be changed
  - ▲ The most track ropes are changed by corrosion or local defaults (fatigue)
- ➔ Your effort with re-lubrication creates lower costs

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