Rouge (or red rouge) is a fine, red iron oxide which forms on the rope, giving it a “rusty” appearance and suggesting that advanced deterioration is taking place. Rouging is caused by fretting, a special type of abrasion which occurs when two solid surfaces bear against one another, while under a heavy load and subjected to small amplitude vibrations. The small amplitude vibrations are due to load vibrations which occur during loading and unloading, and starting and stopping of the elevator. The pressures from the heavy load and vibrations work out any lubrication that may have been present, and result in very small metal particles that have become abraded or torn out of the metal surface. These particles spontaneously oxidize in the air to form the red ferric oxide dust that is characteristic of rouging.

Rouge is different from what we commonly refer to as rust. Rust forms when moisture is introduced to a metal surface. When combined with this moisture, the metal surface, itself, rusts. Rouge does not indicate that a wire rope is beginning to rust. Rouging, instead, means that abrasion is occurring between the wire rope components and that only the small metal particles, now separate from the wire rope, are rusting.

In elevator rope, rouging begins with a lack of core support. This is usually due to a lack of proper field lubrication. The fiber core dries up and cannot provide the
Elevator Rope Rouging

strands with the necessary support. Another possibility is that a solvent or solvent-based lubricant was used, which diluted the existing lubricant and dried out the core and wires within the strands. Rouging occurs where the strands contact the fiber core, and also at the areas of contact between adjacent strands.

Field lubrication does not counteract the effects of rouging or restore the rope to its proper operating condition; the damage has already been done. Field lubrication may appear to stop the rouging, when it actually only temporarily cleans and retards the evidence of the rouge. The evidence of rouge should not, by itself, be construed as an immediate cause for removal, for inspection guidance on the condition of rouging, refer to ASME A17.1-2004 Safety Code for Elevators and Escalators, Paragraph 8.11.2.1.3(cc).

Please note that this code reduces the number of allowable wire breaks (all types) by 50% once rouging occurs. It should also be noted that when the core no longer supports the strands, a reduction in diameter is common. Therefore, in addition to checking the criteria for allowable wire breaks, please refer to the criteria for removal due to diameter reduction. WW suggests an increase in the frequency of rope inspection, with an intent to schedule rope replacement once rouging is evident.

Wire rope products will break if abused, misused or overused. Consult industry recommendations and ASME Standards before using. Wirerope Works, Inc. warrants all Bethlehem Wire Rope® and strand products. However, any warranty, expressed or implied as to quality, performance or fitness for use of wire rope products is always premised on the condition that the published breaking strengths apply only to new, unused rope, that the mechanical equipment on which such products are used is properly designed and maintained, that such products are properly stored, handled, used and maintained, and properly inspected on a regular basis during the period of use. Manufacturers shall not be liable for consequential or incidental damages or secondary charges including but not limited to personal injury, labor costs, a loss of profits resulting from the use of said products or from said products being incorporated in or becoming a component of any product.

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