Wire rope

Wire rope is widely used in crane operations. It consists of three components:

- The wire is the basic unit of the wire rope. The wires form the strand. Most wire is high-carbon steel, but other types of materials are used.
- The strand is made up of a specific number of wires laid in a spiral shape around the core.
- The core is the centre of the wire rope and the foundation that holds the rope together. There are three types of cores:
  - Fibre — synthetic or sisal (plant-based)
  - Strand — two or more wires laid around a single centre wire
  - Independent wire rope core (IWRC) — a full wire rope that can be made of either the same or different materials as the outer-layer strands

About metal fatigue and fatigue resistance

Wire rope is subject to metal fatigue from bending stress while in operation. For this reason, the rope's strength gradually decreases as it is used.

Fatigue resistance involves ways to fight metal fatigue. Wire ropes are designed and built to bend repeatedly under stress to overcome the effects of metal fatigue.

In general, a rope made of many smaller wires will have greater fatigue resistance than a rope of the same size made of fewer, larger wires. That's because smaller wires have a greater ability to bend.

Pre-use inspections

Before using wire rope, inspect it for the following:

- Broken wires
- Severe abrasion or scraping
- Kinking, crushing, or birdcaging
- Other damage from distortion of the rope structure
- Evidence of heat damage
- Cracked end attachments
- Corrosion

If you find any of these defects, you must take the wire rope out of service and follow WorkSafeBC rejection requirements.

Safe work practices

- Never bend ropes over sheaves or drums with diameters so small that wires can be kinked or bent excessively. Follow proper bending requirments
- When selecting a wire rope, apply safety factors (i.e., choose a rope with a higher capacity than the lifting tasks require) to counter surface wear and metal fatigue.
- To reduce tension on the wire rope, never use a sling eye over a hook or pin with a body diameter larger that the natural width of the eye.
- Wrap sharp edges of the load to reduce the risk of damage to the rope.

OHS Regulation references: sections 14.88, 15.7, 15.25, 15.30, and 15.42–15.45

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Project: ..... Address: .....

Employer: ..... Supervisor: .....

Date: ..... Time: ..... Shift: .....

Number in crew: ..... Number attending: .....

Other safety concerns or suggestions: .....

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Record of those attending:

Name: (please print)		Signature:	Company:
1.			
2.			
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Manager's remarks: .....

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Manager: ..... Supervisor: .....

(Signature) *(Signature)*

For more information on health and safety requirements for crane operations in B.C., refer to the *Workers Compensation Act* and the OHS Regulation on worksafebc.com.

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