ATLT-2040: WIRE ROPE APPLICATIONS I

Cuyahoga Community College

Viewing: ATLT-2040 : Wire Rope Applications I

Board of Trustees:
2015-12-03

Academic Term:
Spring 2019

Subject Code
ATLT - AIT-Lifting Technologies

Course Number:
2040

Title:
Wire Rope Applications I

Catalog Description:
Intermediate course covering wire rope applications common to the lifting and rigging industry. Includes understanding wire rope terminology, wire rope constructions, characteristics of various wire rope constructions, and general understanding of wire rope selection.

Credit Hour(s):
1

Lecture Hour(s):
1

Requisites

Prerequisite and Corequisite
Departmental approval: admission to Lifting Technologies apprenticeship program.

Outcomes

Course Outcome(s):
Discuss the different wire rope constructions and describe the advantages and/or drawbacks associated with each construction, as well as rope installation & maintenance.

Objective(s):
1. List an define the terms that pertain to wire rope.
2. Discuss history and grades of steel of wire rope in lifting industry.
3. Discuss the wire rope manufacturing process and explain the function of respective components.
4. Describe the advantages and drawbacks of various wire rope constructions.
5. Differentiate between right and left lay rope.
6. Differentiate between lang lay and regular lay rope.
7. Discuss procedures to follow for proper installation of wire rope on overhead cranes.

Methods of Evaluation:
1. Participation
2. Assignments
3. Quizzes & Exams
4. Practical application projects

Course Content Outline:
1. Terminology
   a. Core
   b. Strand

c. Wires
d. Viscosity
e. Right lay
f. Left lay
g. Lang lay
h. Regular lay
i. Reel
j. Drum
k. Chinese fingers/Kellum grips
l. Plow steel
m. Improved plow steel
n. Extra improved plow steel
o. Extra extra improved plow steel
p. Independent wire rope core (IWRC)
q. Fiber core (FC)
r. Wrap
s. Layer

2. History
   a. Pre 1960's
      i. Grades of steel used
      ii. Core type
   b. Current
      i. Improved grades of steel
         1. Extra improved steel
         2. Extra extra improved
         3. High performance ropes
   c. Manufacturing evolution
3. Manufacture and components
   a. Manufacture
      i. Rod
      ii. Wire
      iii. Strands
      iv. Traceability
   b. Components
      i. Wire
      ii. Strands
      iii. Core
4. Wire Rope Constructions
   a. General purpose wire ropes
      i. 6X19 classification
      ii. 6X36 classification
   b. Special constructions and high performance wire rope
      i. Rotation resistant ropes
      ii. Compacted strand wire rope
      iii. Compacted (swaged) wire rope
      iv. Plastic coated wire rope
      v. Plastic filled wire rope
      vi. Plastic coated or plastic filled IWRC wire rope
   c. Right lay
   d. Regular lay
   e. Lang lay
5. Advantages and drawbacks
   a. Advantages
      i. Abrasion resistant
      ii. Fatigue resistant
      iii. Crush resistant
   b. Drawbacks

i. Stiffness
ii. Bending fatigue
iii. Wire size

6. Lang & regular lay

1.Wire & core

1. Parallel to core
2. Angular to core
3. Abrasion resistant
4. Crushing susceptibility
    a. Left lay and right lay
    b. Rope installation

a.Cable lay out

b.Reel orientation

c.Top/bottom of reel

d.Joining new to existing

1. Maintenance and lubrication

1.Maintenance

1. Inspection
2. Clip torque

2.Lubrication

1. Viscosity
2. Penetration

Tackiness

Resources

Handbook of Rigging for Construction and Industrial Orientation. *Rossnagel, Higgins, and McDonald.* 4th ed. Boston, MA: McGraw Hill, 1998.

Wire Rope Technical Board. *Wire Rope Sling User's Manual.* 3rd ed. Alexandria, VA: Wire Rope Technical Publishing, 2007.

Leach, Robert. *Rigger's Bible.* Revised Edition. Springfield, MO: Roark Printing, 1955.

Resources Other

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1. https://www.asme.org
2. https://www.osha.com
3. https://www.wstda.com
4. https://www.mazzellacompanies.com

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