Section 8
Gears & Couplings

Training Objective

- At the completion of this section, students should:
  - have a thorough understanding of the inspection requirements associated with crane and hoist gear-boxes and couplings
  - be able to interpret the most common types of crane gear failures.

  This understanding should be based on a working knowledge of what causes gear failure.

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Gears

Reference:

- OSHA 1910.179(e)(6)
- OSHA 1910.179(j)(3)(iv)
- ASME B30.2-2.1.3
- ASME B30.11-2.1.3
- ASME B30.17-2.1.3
- ASME B30.16-2.1.3
- CMAA Spec #70 & #74

INSPECT:

- Gear case
- Gears
- Breathers
- Lubrication
- Oil quantity & quality
- Oil leaks
- Guards

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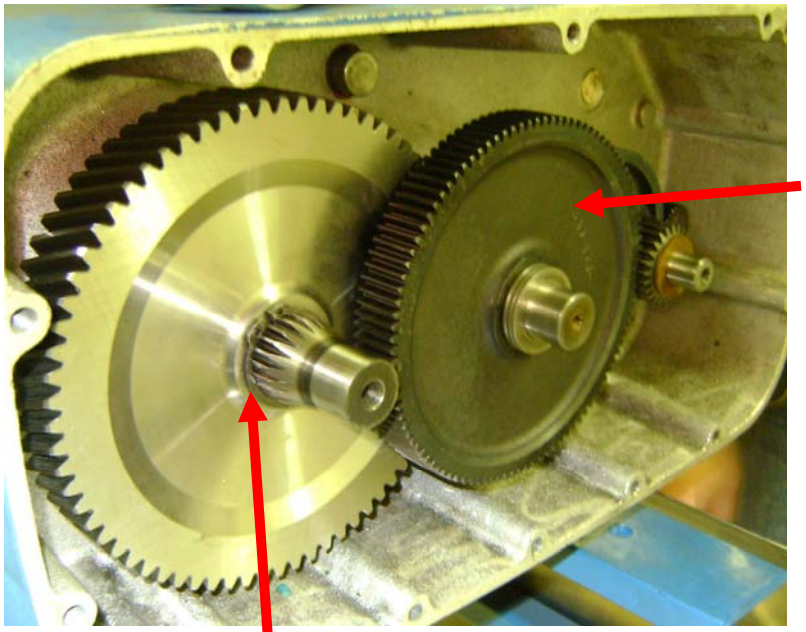
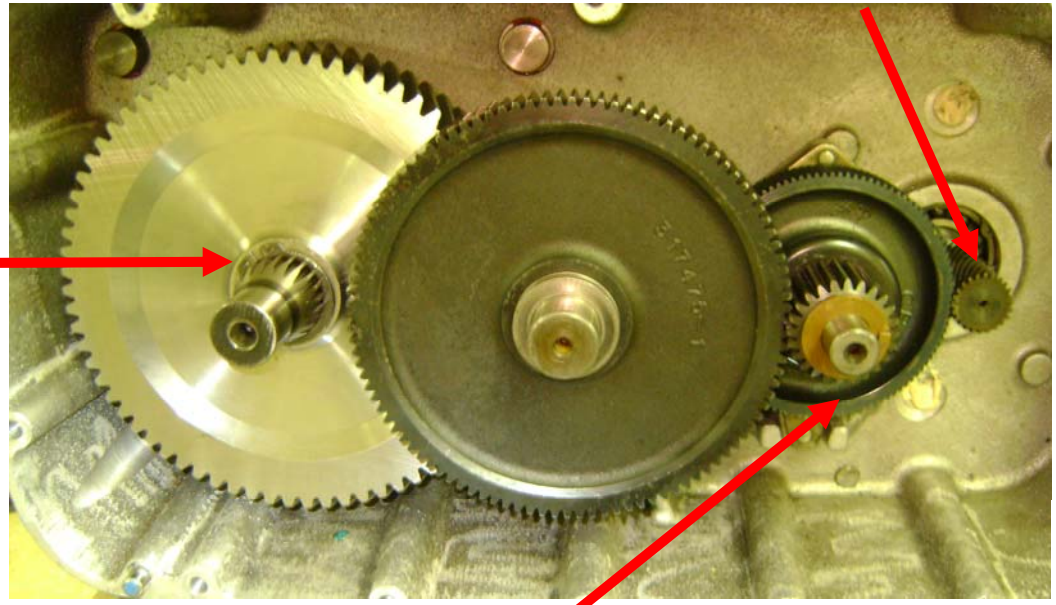
Gears



Intermediate Gear

External Snap Ring

Motor Shaft



Load Brake Assembly

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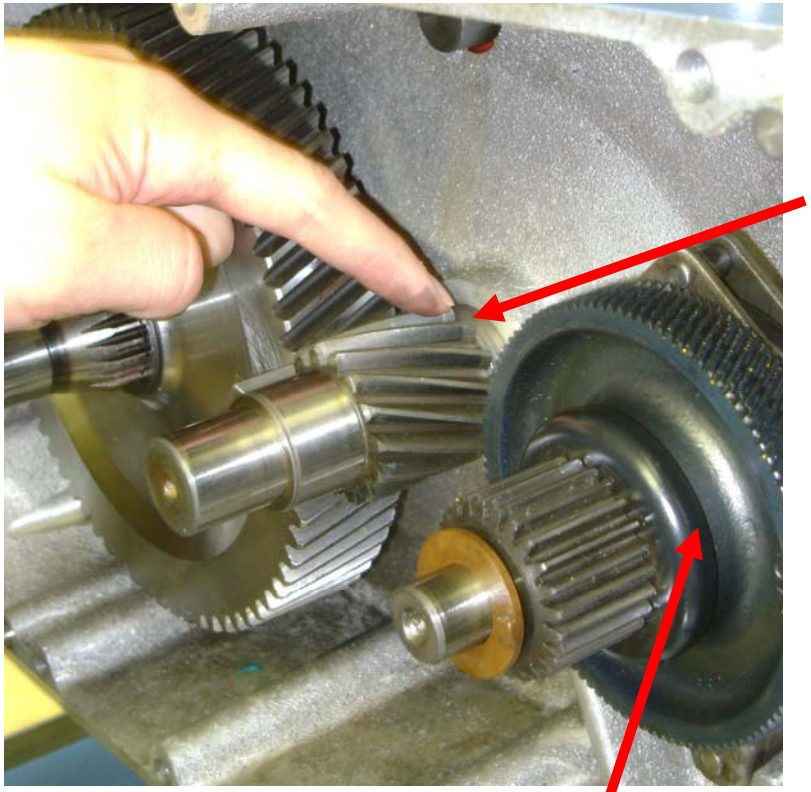
Gears

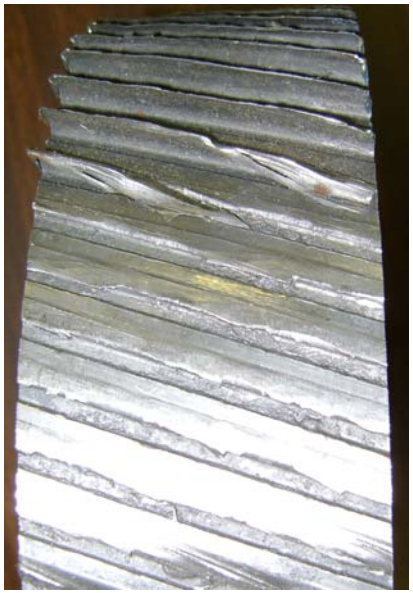


Roller Thrust Bearing
(both sides)

Load Brake Assembly has a Steel Thrust Washer behind it for wear

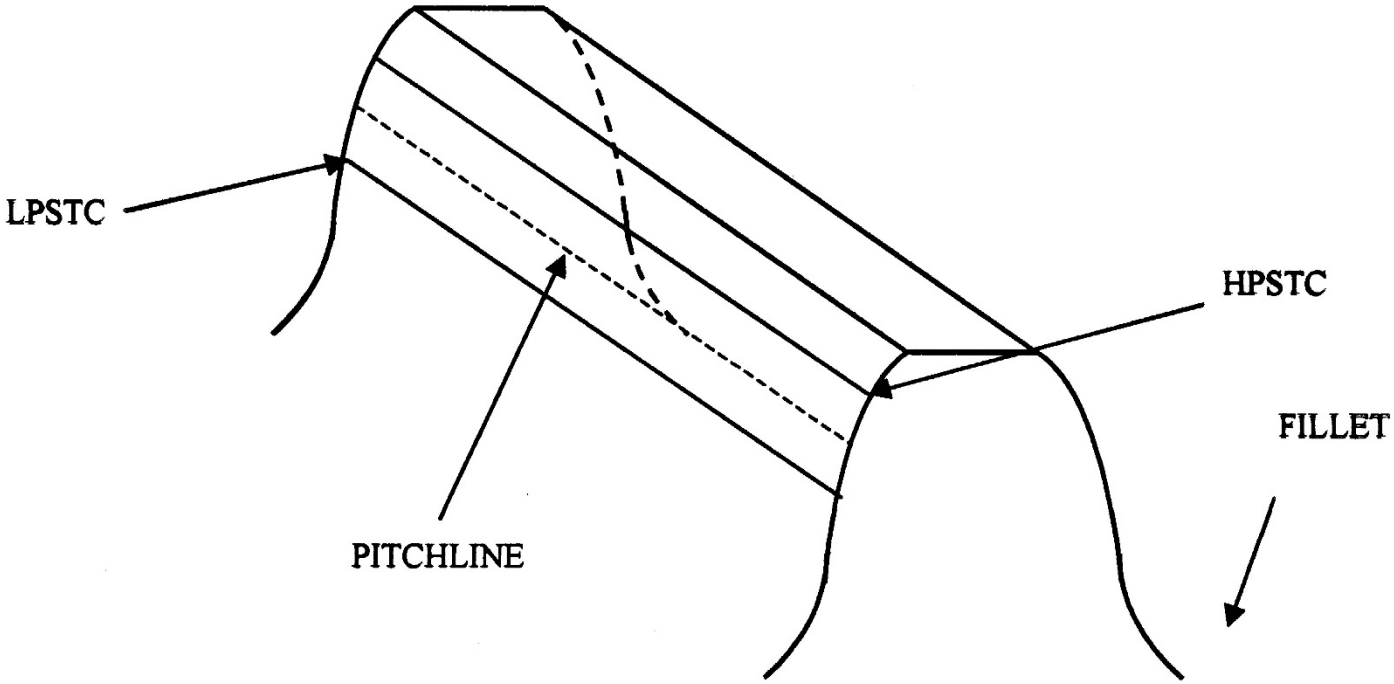
Load Brake Assembly

Gears



Sure signs of bad gears (worn) Strange sounds coming from the gear box also lack of lubrication

Gear Profile



GEAR TERMINOLOGY

HPSTC - Highest Point of Single Tooth Contact

LPSTC - Lowest Point of Single Tooth Contact

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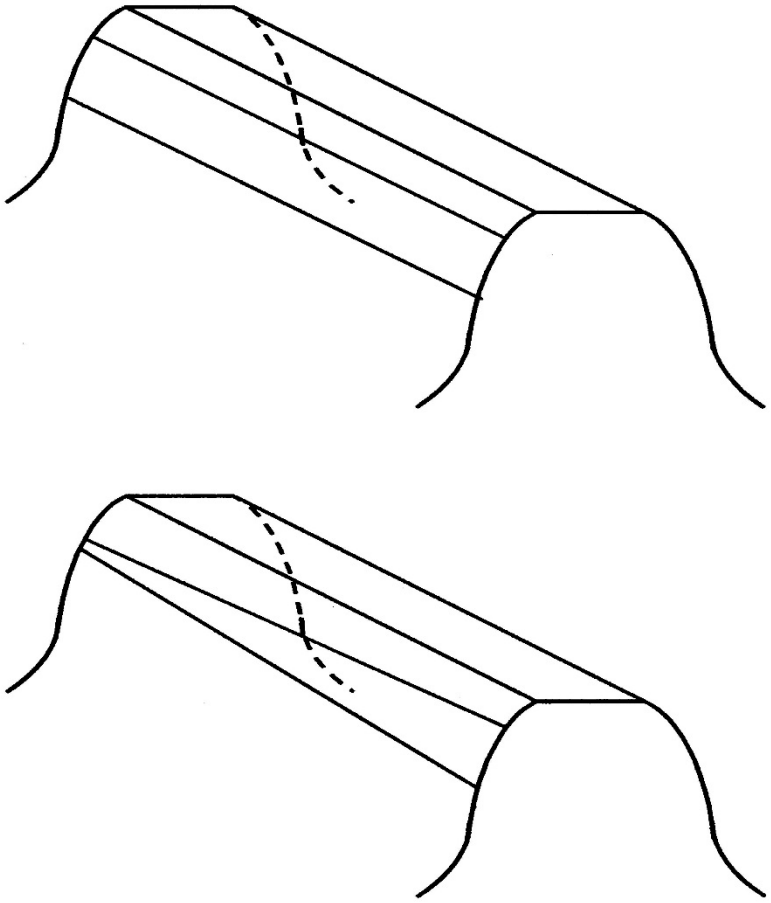
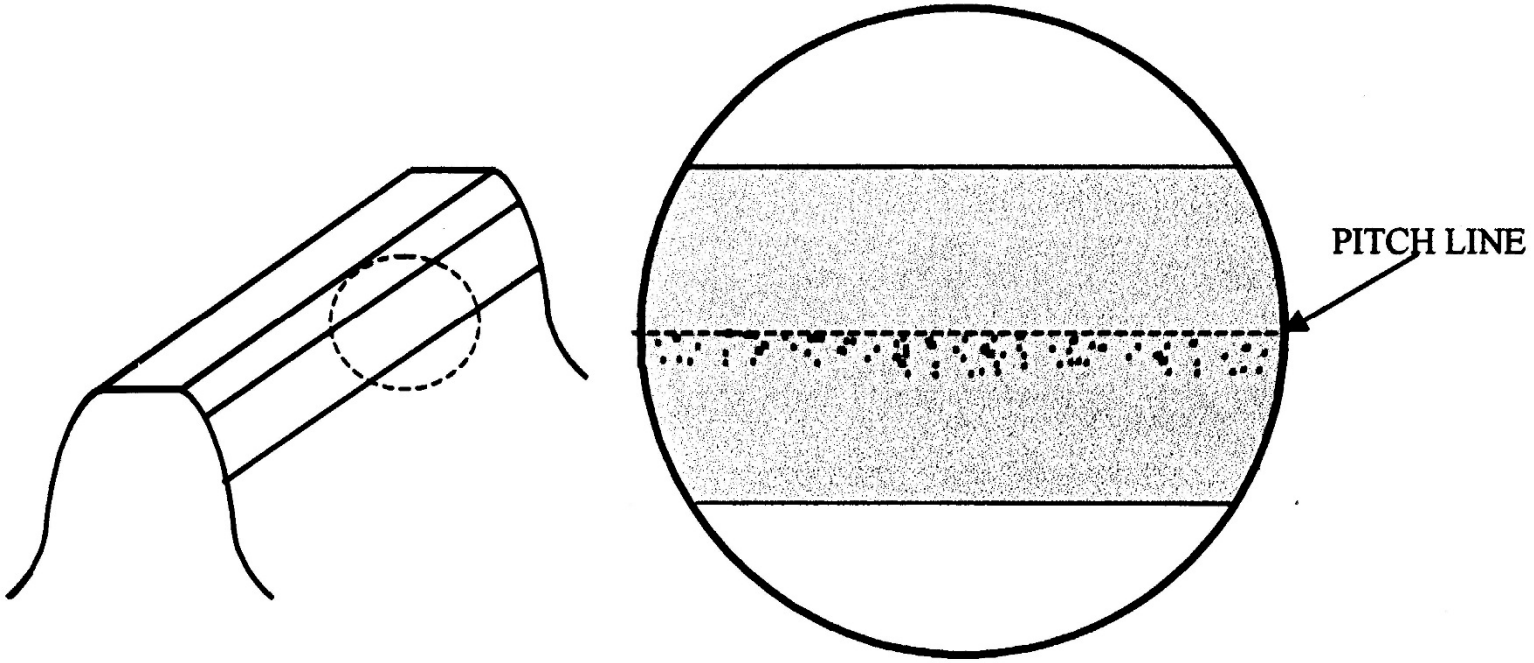
Gear Profile



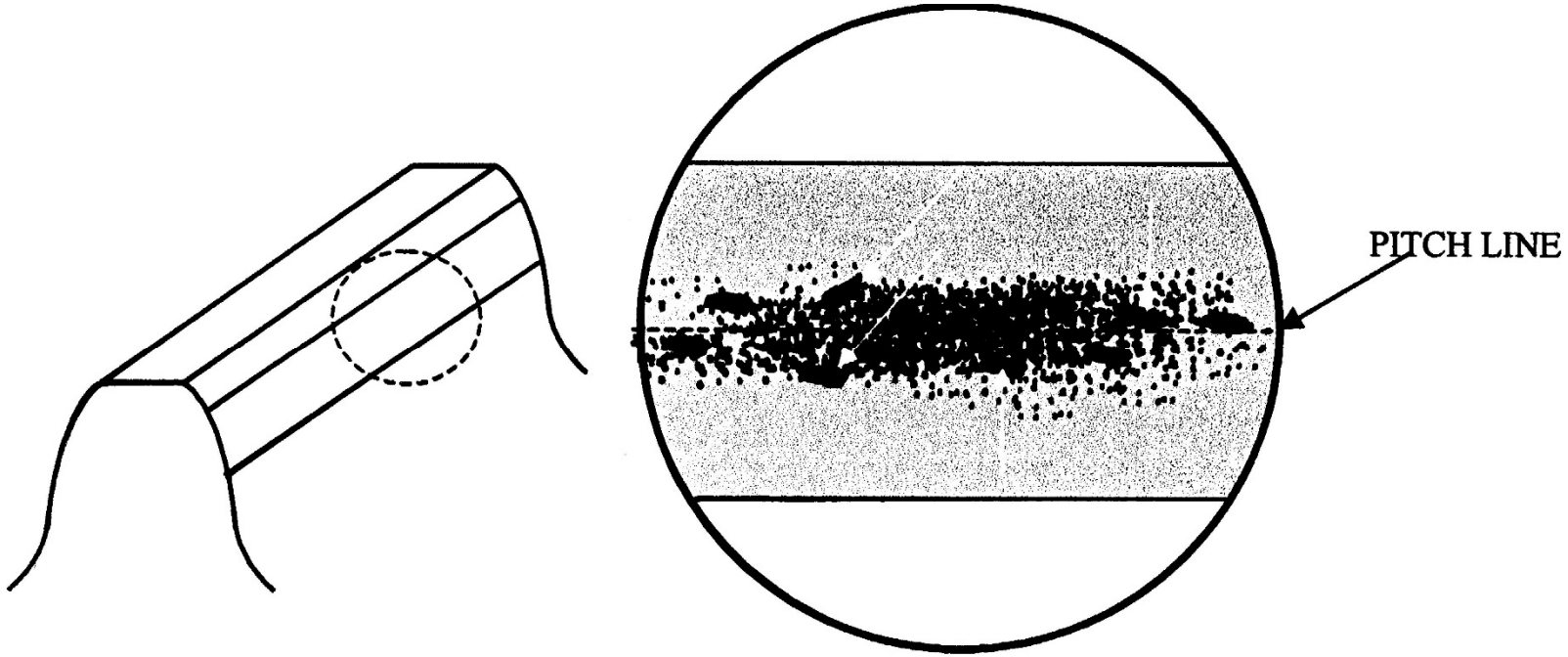
INSPECT:

- Wear pattern
- Cracks
- Pitting
- Facial irregularities

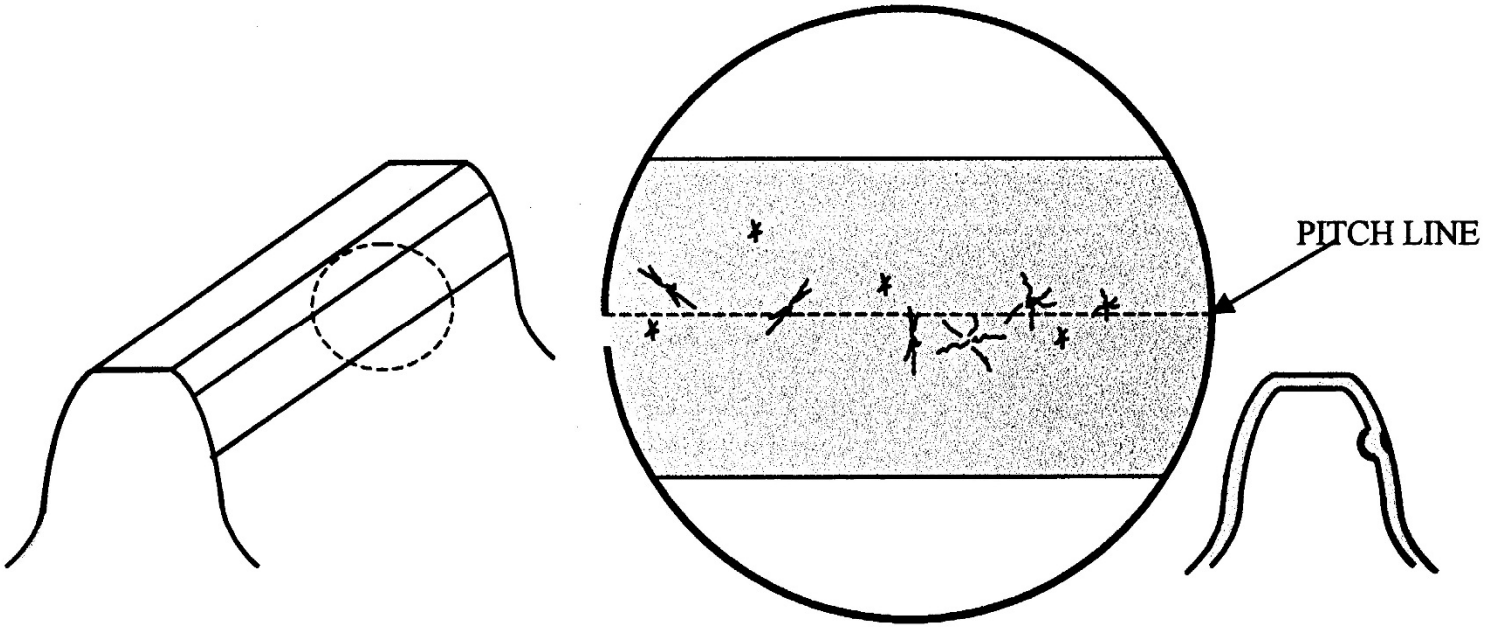
Pitting



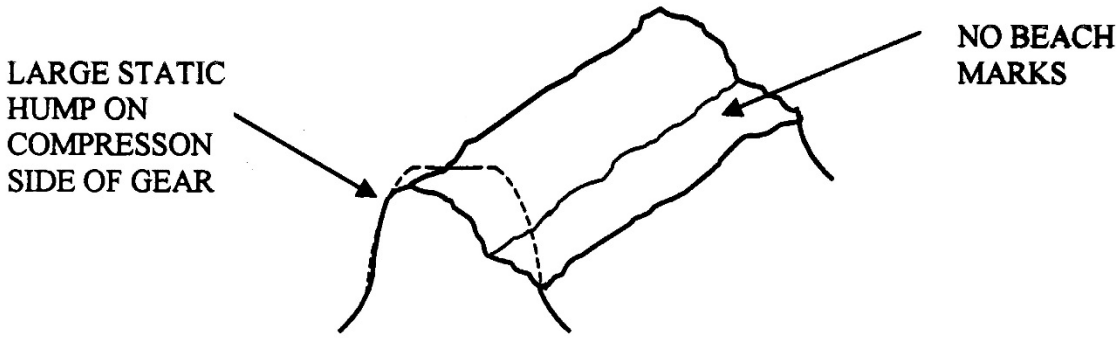
Spalling

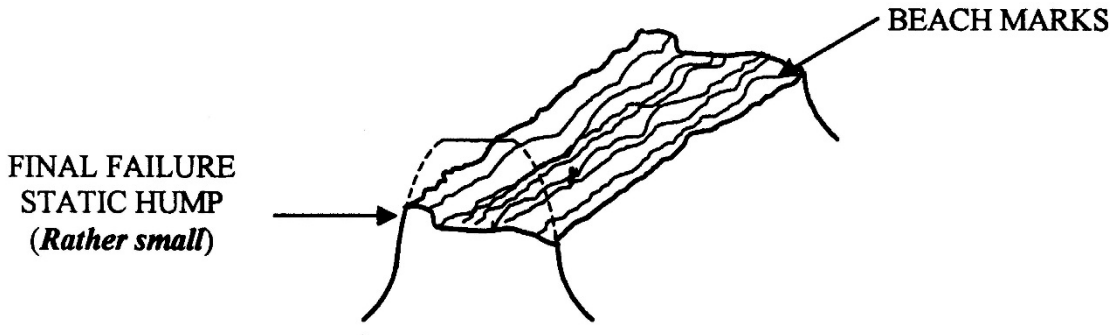


Case Crushing



Failure Analysis





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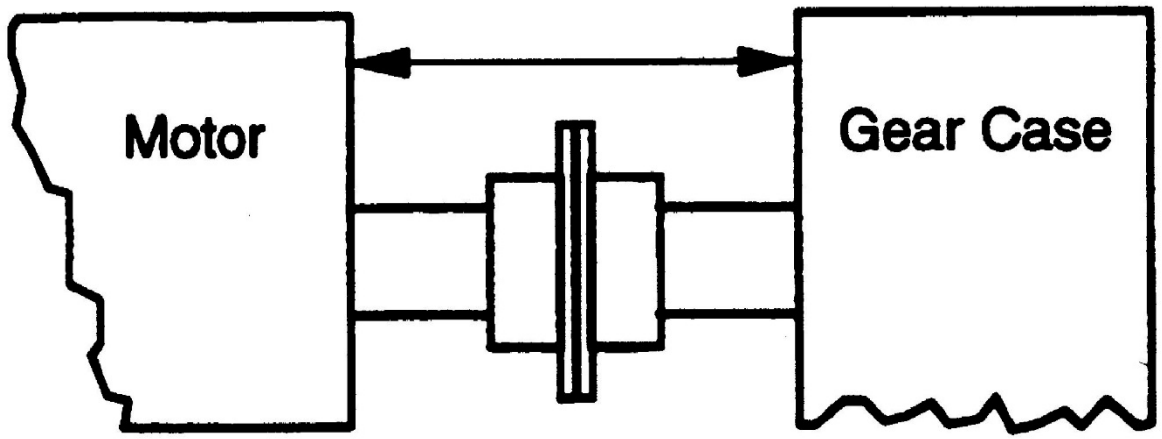
Couplings

Reference:

- OSHA 1910.179(e)(6)
- OSHA 1910.179(j)(3)(iv)
- ASME B30.2-2.1.3
- ASME B30.11-2.1.3
- ASME B30.17-2.1.3
- ASME B30.16-2.1.3
- CMAA Spec #70-4.12 & #74-4.6

INSPECT:

- Shaft
- Coupling bolts
- Lubrication
- Guards



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CMAA Spec #70-4.12 Couplings

4.12.1

Cross shaft couplings, other than flexible type, shall be made of steel or minimum ASTM A48, latest edition, Class 40 cast iron or equal material as specified by the manufacture. The type of coupling (other than flexible) may be compression, sleeve or flange type. Flexible couplings shall be the crane manufacture's standard type.

4.12.2

Motor couplings shall be as specified by the manufacturer.

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CMAA Spec #74-4.6 Couplings

4.16.1

Cross shaft couplings, other than flexible type, shall be made of steel or minimum ASTM A48, latest edition, Class 40 cast iron or equal material as specified by the manufacture. The type of coupling (other than flexible) may be compression, sleeve or flange type. Flexible couplings shall be the crane manufacture's standard type.

4.6.2

Motor couplings shall be as specified by the manufacturer.

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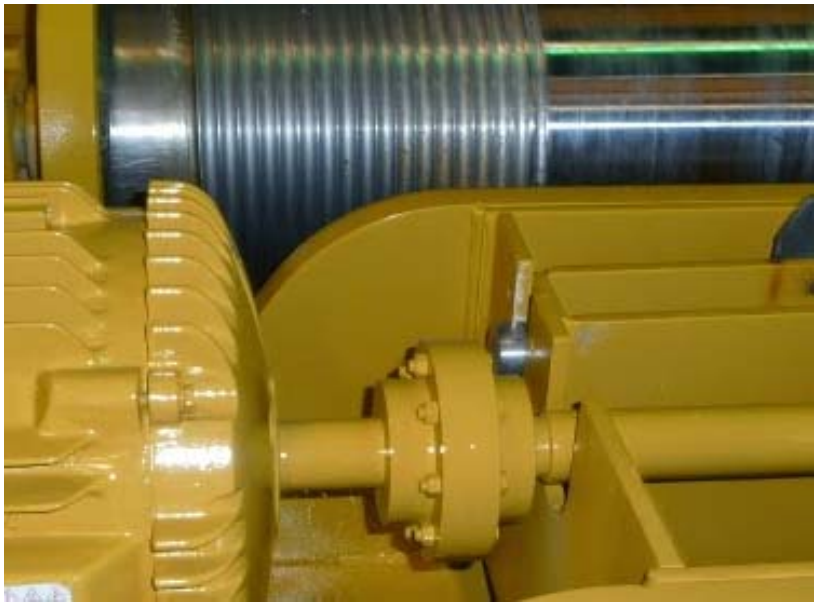
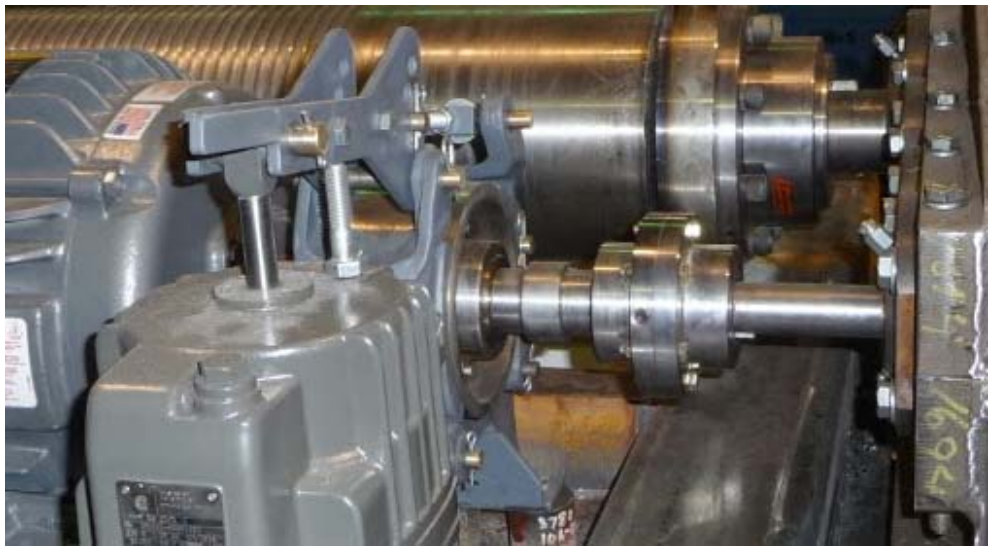
Couplings





Questions??

Thanks for your attention,
let's take a break!

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