



# Hydraulic Decoking System

Crosshead and Free Fall Arrestor

*Under its Worthington<sup>®</sup>, Pacific<sup>®</sup> and IDP<sup>®</sup> heritage names, Flowserve hydraulic decoking systems are installed in more than 150 refineries worldwide.*



## Crosshead Provides Function and Safety

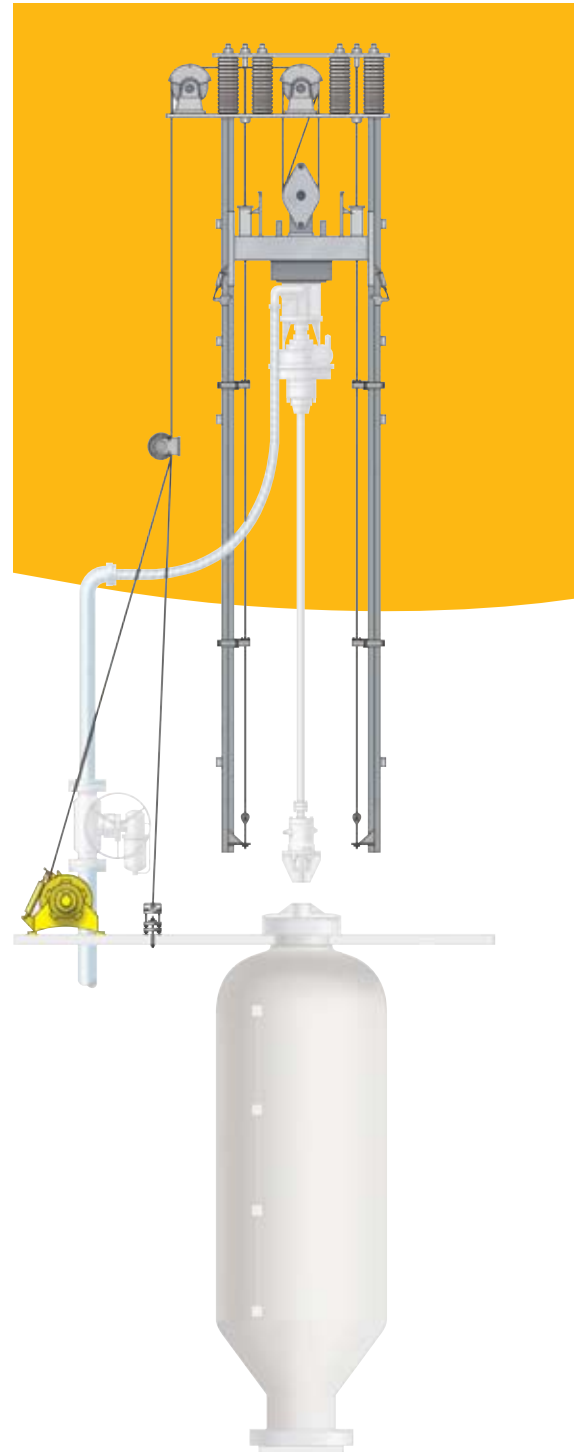
*Required to guide and center the rotary joint-drill stem-cutting tool assembly in the drum, the crosshead is designed to safely absorb all torque loads normally sustained from cutting operations.*

Crossheads are available in two styles:

- Shoe-type
- Wheeled-type

The shoe-type design has two rectangular segments that are shaped to form the shoes. These shoes ride inside the beams of the structure.

The wheeled-type design utilizes four wheel blocks with spring loaded guides in two planes. These wheels ride on a track attached to the beams of the structure.



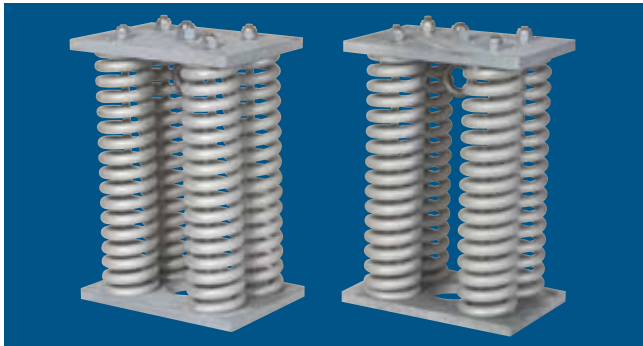
**Experience In Motion**

### Free Fall Arrestor Ensures Safe Operation in Severe Environments

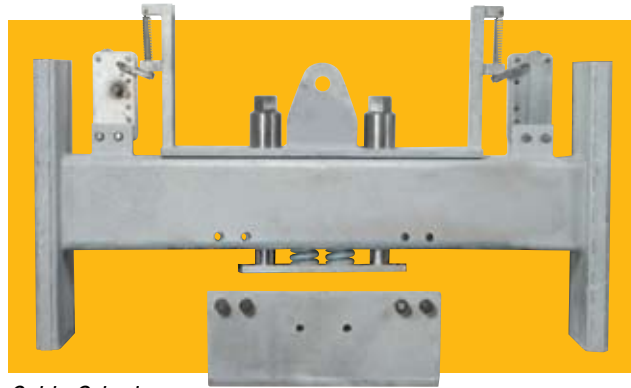
Both types of crossheads can be supplied with free fall arrestor (FFA) systems, which prevent equipment from collapsing in the event of a suspension failure. The free fall arrestor is a completely self-contained system (except the cables and rails) which is built into the crosshead. No electric or pneumatic connections are required for activation.

Additionally, the Flowserve free fall arrestor provides these benefits:

- Operator personnel and equipment safety in the event of steel wire rope failure
  - Prevents cutting assembly from falling and ramming coke bed
  - Prevents damage to ancillary equipment
- Proven reliability
- Automatic disengagement upon the restoration of the required tension

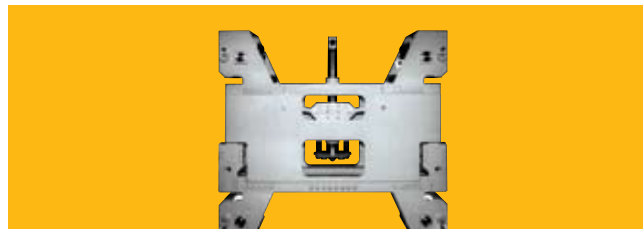


Arrestor Springs



Cable Gripping

- Compressed springs activate unique cable gripping devices that lock onto auxiliary arresting cables to stop the free fall
- The cable grippers are activated through linkage by compressed springs whenever main support cable tension is lost
- The auxiliary cables are suspended from damper spring assemblies that reduce peak shock loads on the tower and auxiliary cables during arrest



Rail Gripping

- Free fall arrestor grips on solid guide rails
- Proven equipment from elevator industry
- Guide rails and installation accessories are part of the Flowserve standard scope of supply

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