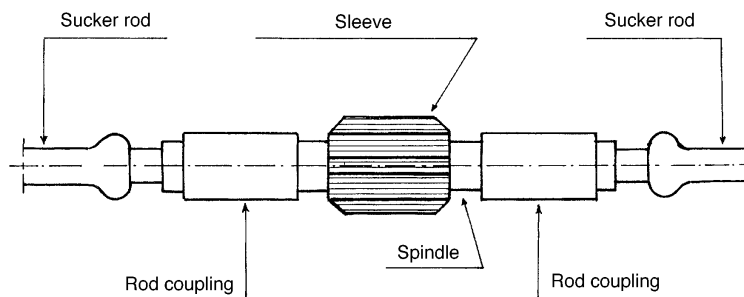


## Sucker rods centralizers

Sucker rods centralizers are made up of three components:

- **Spindle** - 4140 (tool steel).
- **Sleeve** - Kevlar-Nylon co-polymer, to resist sand imbedment. Impervious to aromatics and H<sub>2</sub>S. The temperature rating is 120°C (250°F)
- **Rod Couplings** - Supplied by PCM or customer supplied.



Sizes Available:

Spindle API threads (pin x pin)	Sleeve Tubing size
3/4"	2 7/8"
7/8"	2 7/8" - 3 1/2"
1"	2 7/8" - 3 1/2" - 4 1/2"
1 1/8"	3 1/2" - 4 1/2"

Other sizes available on request

### Advantages:

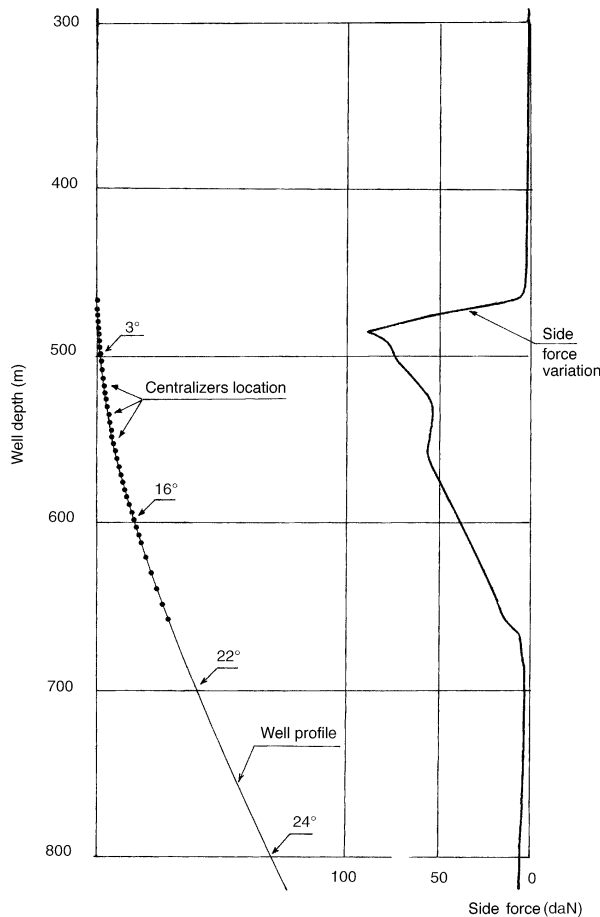
- 1) Stabilizes rod string
- 2) Eliminates or reduces tubing wear
- 3) Eliminates rod coupling wear
- 4) Non-rotating feature
- 5) Easily installed
- 6) No special installation tools required
- 7) Sleeves tapered for rod tripping
- 8) Reduces torque in deviated wells
- 9) Reduces workover frequency
- 10) Only worn sleeves need to be replaced during following workovers



**Cautions:**

- Sleeves can wear out rapidly in severe conditions *if over-loaded*.
- Over-loading in abrasive conditions can also wear out spindles.
- Rod count will change with large number of centralizers installed.

When a directional survey is provided, PCM will use a computer program to calculate Rod/Tubing side loading for exact placement of Non-Rotating Centralizers in rod string design.



In abrasive conditions PCM recommends centralizing the sucker rod string wherever the coupling/tubing loading would exceed 25 lbs. ; in non abrasive conditions, PCM recommends centralizing wherever the loading would exceed 50 lbs. Sufficient centralizers should be installed to keep the loading below 100 lbs. on each centralizer. In severe dog-legs, pony rods may be required to increase the number of centralizers sufficiently. PCM's programs will design the entire string.

*example of well centralizer location with side force versus well profile*

PCM also recommends the use of a minimum of 20 Non-Rotating Centralizers on vertical wells as follows:

- To prevent the eccentric motion of the rotor from being transmitted to the rod string, 1 placed 12 feet **above** the rotor head plus 1 on top of each of the next 2 full sucker rods.
- To prevent any wobble in the rod string from being transmitted to the polished rod, which would prevent the stuffing box from sealing around the polished rod; 1 placed at the bottom of the polished rod plus 1 placed at the bottom of the adjacent sucker rod.