

Protecting your investment in sucker rods

Part 2: Running and Re-Running

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As discussed in Part 1 of this series (*Well Servicing July/August 2005*), the rod string is a vital link between surface and subsurface equipment in a rod pumped well. A significant monetary investment is necessary along with a considerable amount of time. The API document, Recommended Practices 11BR, states "...useful sucker rod strength is limited by the fatigue performance of a metal in a non-corrosive environment." But "...the fatigue life can be dramatically decreased by improper installation..." Many improper activities can cause rod damage so severe that failure can result in just a few days following initial installation. The proper and consistent procedures of running sucker rods into a producing well takes time and should not be a race against the clock. Time spent wisely is sure to pay off in terms of longer run times without unnecessary downtime and rod replacement.

General running and re-running information

(1) Rod string components should be inspected upon delivery to verify quantity, size, length, type or grade, pin size, guide size, style and/or load capacity. They should also be examined to verify that the components were not damaged during the delivery process.

(2) Protectors should not be removed from the components until the string is ready to be installed, except for inspection purposes, and then immediately reinstalled after the visual examination is complete. These protectors and packaging materials are preserving your investment from the surrounding environment until you can place it into the environment for which it was designed to operate. Whenever a component is observed to be without such protection, it should be inspected and, if undamaged, thoroughly cleaned and a suitable protective coating reapplied and the protectors reinstalled.

(3) Loose rods should be stored at the well location in the same manner required at storage yard facilities. Non-metallic supports should be used to ensure that rods are not bent and metal-to-metal contact is avoided. Metal-to-metal contact is an opportunity to damage the surface of the rod and potentially lead to premature failure (*Figure 1*).

(4) Pony rods and couplings should be delivered and stored on separate pallets until ready for use. The same level of care and attention should be given to these accessories as is given to the sucker rods (*Figure 2*).



Figure 1



Figure 2

Running the rods

(5) It is extremely important that the well servicing rig be correctly positioned over the wellbore. The rod hook must be positioned directly over the tubing bore in order for the sucker rods to feed into the tubing without creating friction on the sides of the running nipple. Any friction, undoubtedly, will rub off any corrosion inhibitor film and may possibly damage the surface of the rod due to the aggressive metal-to-metal contact. The lack of corrosion protection and/or the work hardening of the area will create a small anodic area and corrosion will be accelerated in this spot and premature failure may result.

(6) The rod bundles that are ready to be installed should be broken open in a safe manner that will not cause rod surface damage. This can be accomplished

using side cutters or tin snips to cut the steel banding. Axes, crescent wrenches, claw hammers, or any other tool can easily cause damage to the rods and may also cause injury.

(7) The rod bundles are not designed to be used as a work surface. Do not place tools, pipe or other equipment on the rod bundles as this will increase the possibility of rod surface damage.

(8) Dumping the couplings out on the ground for faster access to them may cause failure for every coupling that retains contamination in the threads. To properly clean the threads on couplings contaminated in this manner will take a great deal of time. The threads will gall if not kept free of solid material.

(9) The pony rods are nothing more than shorter rods and are susceptible to the same types of damage as a regular length rod.

(10) Unscrew the rod thread protectors by hand or with an air impact wrench. Knocking off the thread protectors will leave plastic remnants on the rod threads that will damage the threads during makeup or when they are broken out on the next pump pull. Do not remove them until it is time to install the rods. It is best to keep them covered and protected as long as possible.

(11) When removing box protectors DO NOT engage the coupling threads with the screw driver. This action always results in thread coupling crest damage and will more than likely fail downhole.



Figure 3



Figure 4

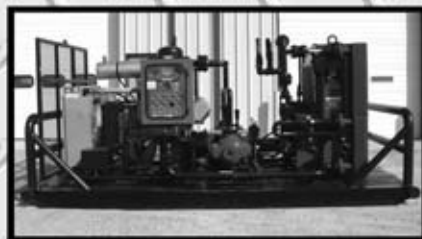
(12) Clean and inspect pins and boxes. "New" rod pins are coated with corrosion inhibitor from the manufacturer; not thread lubricant. The pins of the rods in the derrick often have been contaminated by wellbore fluid, unknown lubrication type and even



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Figure 5

blowing sand. These contaminants need to be removed and the threads re-lubricated.

(13) The API sucker rod coupling is designed as a rotary-shouldered, friction-loaded, fluid-free connection between sucker rods (**Figure 3**). Apply a small amount of lubrication to the pin or coupling threads to help reduce the interference between the threads (**Figure 4**). The rod shoulder and box face contact requires friction to maintain proper makeup. Lubrication in the friction contact area will increase



Figure 6

likelihood of pin failure. The faces must remain clean and dry throughout the makeup procedure.

(14) Sucker rod thread-lubricants need to be smooth, with a grease-like consistency, and contain corrosion inhibitors and anti-oxidants to reduce the interference-fit between the threads. Topco SRL is such a lubricant. If no other lubricant is available use the grease gun off the rig. Ensure that the lubricant has no fillers.

(15) Inspect the rod elevators regularly and repair or replace them if their use may result in damage to the rods. Ensure that the seats are smooth and round in shape, that the latch opens with resistance and snaps shut, and that the bail moves back and forth freely. Elevators can inflict mechanical damage to the rod upset taper if seats are not smooth or the elevators can corkscrew the entire string if they open at the wrong time (**Figure 5**). The individual rods will be bent near the ends if the elevators do not pick up the string weight in a level fashion due to their inability to swing freely.

(16) As you begin to pick up the rods, remember that every rod must be tailed into the derrick (**Figure 6**). Rods that run down the bundle damage every rod they hit. Rods that are dragged through the dirt have contaminated threads and may gall. These threads must be thoroughly cleaned and inspected for damage.

(17) Be sure to use bell nipple, a stripper or a swage nipple for the running nipple. A piece of cut-off tubing may damage most every rod you run.

(18) Power tongs are the recommended tools for making up joints on virtually all sucker rod strings. They must be set up properly to provide the circumferential displacement specified by the manufacturer. The displacement card must match all four (4) characteristics of the rod (size, grade, condition and manufacturer) to ensure accurate displacement calibration of the power tongs (**Figure 7**).

(19) Make up the rod and coupling connections by hand and scribe a vertical line on the coupling and lower rod shoulder and then unscrew the lower connection until roughly two pin-threads are left engaged by the coupling. Note: When making these initial connections, the rod must be hanging free in

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Figure 7



Figure 9

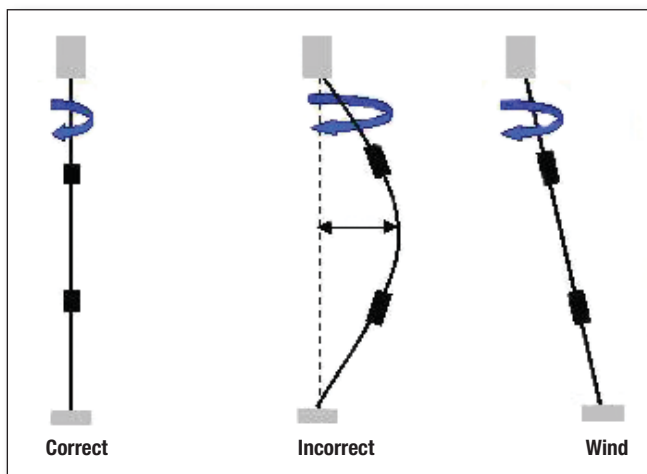


Figure 8

the rod elevators squarely over the joint below. When stabbing the rod pin into the coupling the rod should be hanging straight and without slack to avoid cross threading (**Figure 8**).

(20) Make sure the engine rpm's are at full throttle. Then pull the rod tongs to the connection, engage the connection with the rod tongs using the lowest speed possible.

(21) Maintain full engine rpm's throughout makeup and stall the rod tongs and do not "bump" the connection. Back away the rod tongs and idle down the engine rpm's.

(22) Match the circumferential displacement on the rod coupling connection to the proper card. (**Figure 9**) Adjust the power tongs to create the displacement necessary. Do a mechanical integrity check of the rod tongs by checking the next 4 to 5 joints to verify the pressure adjustments are correct and maintained. Check every 12th connection as you go into the hole with the sucker rods and adjust the power tong pressure accordingly.

(23) Note: Cross threaded connections are not acceptable. Always start every connection by hand, with at least two full threads engaged before putting the power tongs on the joint. The tongs are capable of cross threading the joint and the joint will fail.

(24) Pulling rods can also damage them, particularly if you are pulling the rods and laying them down. It is possible to lay down singles without much damage, but it is virtually impossible to lay down doubles without damaging the rods.

Consistently prepared joints and damage free string installation will enhance the likelihood of long productive sucker rod service life. 📖

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