Use Dynamometer Data to Identify Solids Impacting Pump Operation

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Dynamometer data can be used to identify sucker rod pumped wells producing liquid with solids impacting the operation of the sucker rod pump. Foreign material in the pump can cause erratic pump behavior due to the delay in traveling valve, TV, ball going on seat and can cause severe shock loads which result in increased rod string and pump failures. On the up or down stroke when solids hold the ball off the seat the concave-outward shape of the pump card can be used to diagnose excessive pump/plunger assembly leakage. The standing or traveling valve stuck open condition occurs when trash, sand, scale, asphaltene, or some other foreign material lodged in the valve assembly causes the ball to stick in the cage and/or rest off of the seat. When the ball is continually stuck off the seat during the stroke, then a constant load (0 or fluid load) is applied to the rods and pump action of transferring the fluid load between the rods and the tubing ceases. “Spikey” loads can also occur if solids are dragging between the plunger and the barrel. The current recommended practice for sucker rod pumping is to operate with the down hole pump filled with liquid, but the presence of solids in the pump can create dramatic changes the typical rectangular full pump card shape. Field dynamometer data acquired on many different wells will be used to show the symptoms of solids/foreign material impacting the performance of the sucker rod pump.