

## Designing Rod Pumps

A Rod Pump is quite a sophisticated piece of equipment, the design of which involves a lot of engineer time to ensure that all the calculations are correct.

A rod disappears into the ground stretching down into the oil reservoir.

A thousand feet of 2 inch wide metal rod acts like elastic band. The longer and heavier the rods are the more they stretch. If the rod isn't moving, it just stretches and sits there. The problems start when the rod pump engine moves the rod up and down.

Getting this amount of metal to move is tough enough, but the engine needs to move it up for several seconds (upward stroke) and then completely reverse its direction a few seconds later (downward stroke).

This reciprocating motion makes the length of metal rod behave like a bungee. If the engine starts pushing the rod down whilst it is still trying to come up then massive forces (potentially destructive) are created.



My role was to apply my engineering skills to understand these problems. Having an engineering background allows us to understand these sorts of complex problems. We also worked alongside oil engineers from one of the world's leading oil companies who have extensive experience of oil extraction.

These skills combined with the power of today's personal computers allowed us to develop a notebook PC based rod pump design and tuning tool that any engineer in the field could use.

In addition to the tuning and diagnostics facilities, data could be transmitted back to a central computer system that does further analysis and collation of data from many different pump installations. This allowed remote monitoring of, for example, maintenance problems and production rates.

The benefit to the customer was to allow technicians to specify most of the elements of the rod pump and perform the bulk of the calculations necessary to safely build the pump. This both cuts costs and reduces time of development.