



Optimization, Predictive Analytics, & Real-Time Process Models

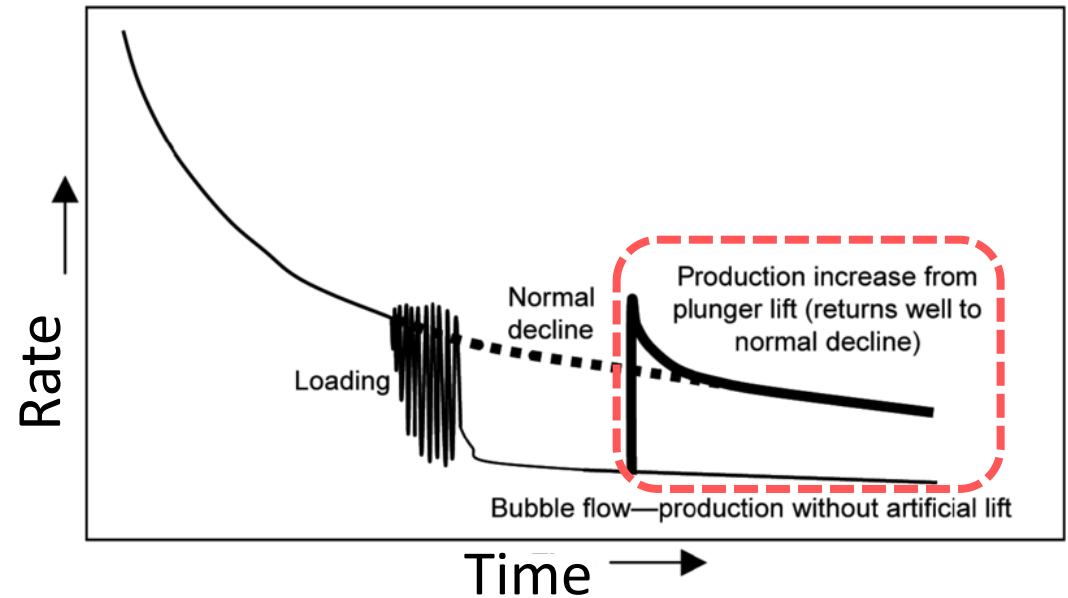
Plunger Lift Analytics

Benefits

- Reduce operating costs
- Optimize well production and plunger lift operation (Machine Analytics)
- Alert about abnormal situations
- Provide usable data for analysis
- Monitor plunger lift and system characteristics 24/7 from anywhere with HTML 5 technology

Plunger Lift

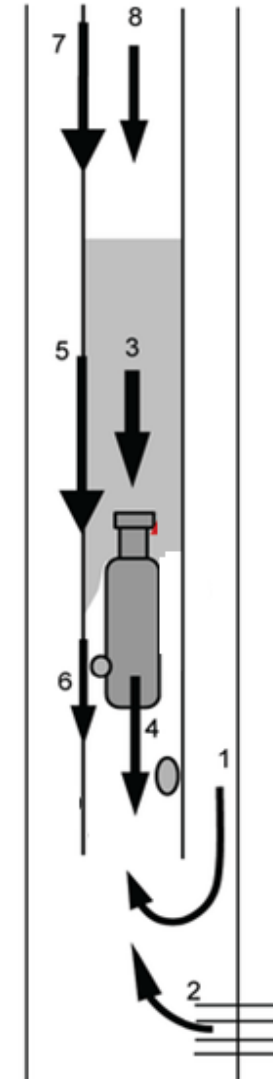
- The plunger lift method is employed to revitalize the production rate of older wells
- A plunger acts as a seal that ensures all incoming gas remains below plunger
- Once pressure of incoming gas becomes large enough the valve is reopened and pressure carries liquid into the pipeline



Mathematical Model

- Use standard conservation laws
- Add forces due to plunger
- Simulate control valve

1. Casing Pressure
2. Reservoir Pressure
3. Liquid Weight
4. Plunger Weight
5. Liquid Friction
6. Plunger Friction
7. Gas Friction
8. Line Pressure



Benefits

- Use spectrum of analytics
 - Optimize well production
 - Reduce energy and maintenance costs
 - Extend life cycle
 - Improve availability and reliability
- Combine with web applications
 - Build domain knowledge
 - Increase operational intelligence