

LINEAR ROD PUMP (LRP) AN EFFICIENT PRODUCTION SYSTEM

SPE Hungarian Section Workshop
**Practices in the Production Enhancement and
Cost Optimization in CE European Region**



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AGENDA

- Introduction
- Description of LRP
- Drive mechanism
- Advantages of LRP
- Conclusion



INTRODUCTION

- Background of the invention
- First LRP
- Same downhole equipment
- Application of LRP:
 - 50 to 8000(15 to 2500m) feet depth
 - 5 to 300 BPD
 - up to 8700kg peak rod load

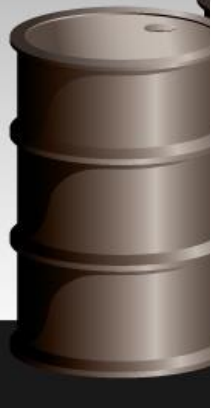
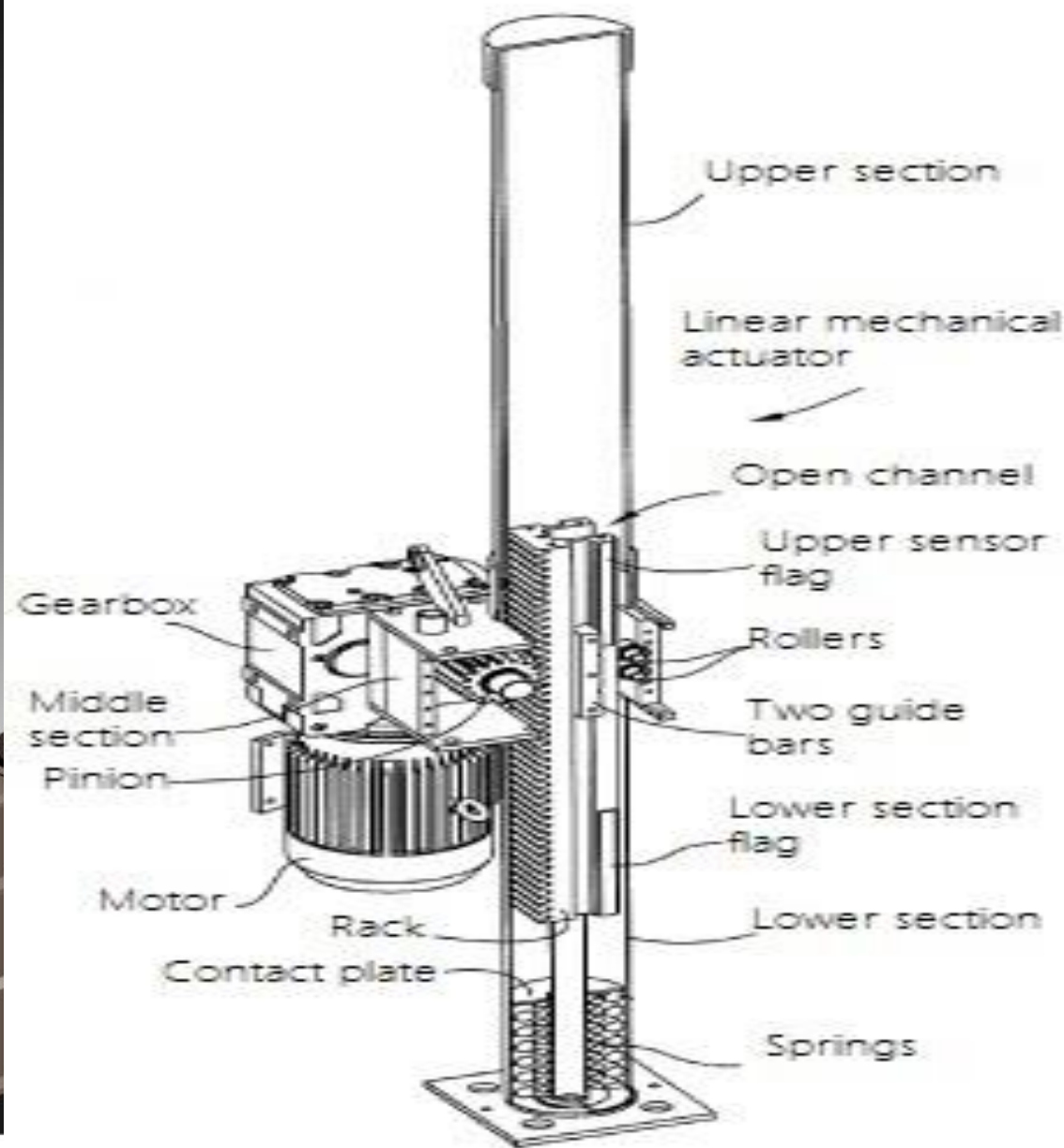


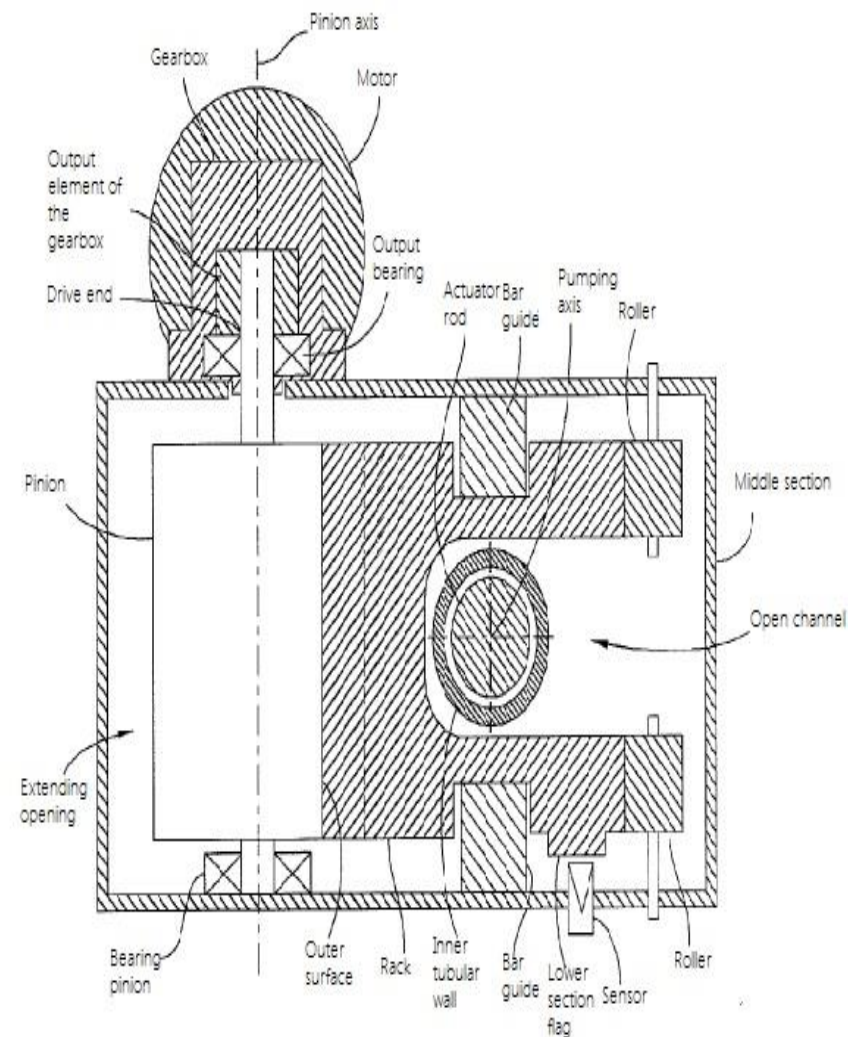
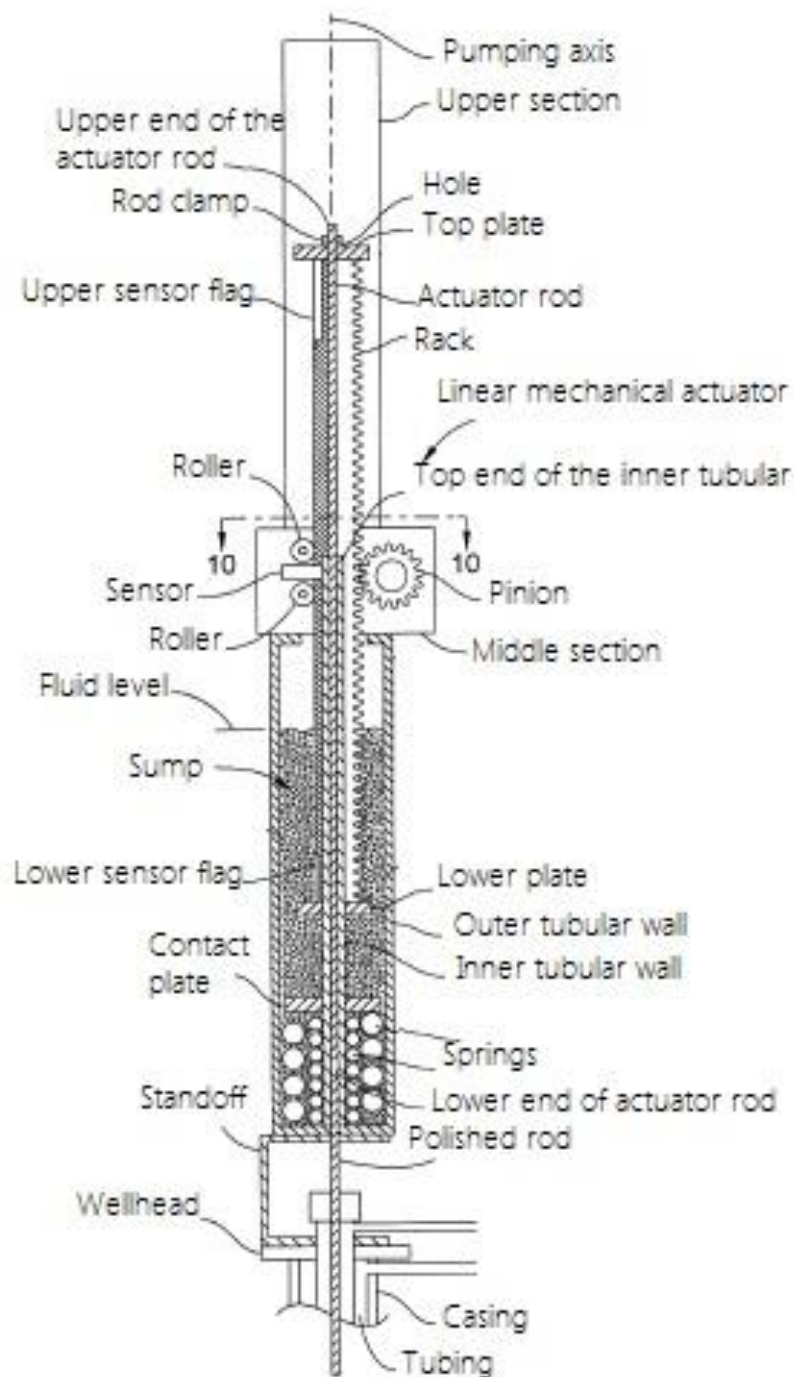
LINEAR ROD PUMP

- Ensures vertical movement of rod string and sucker rod pump using a simple rack and pinion mechanism
- 3 main parts of LRP:
 1. Linear mechanical actuator
 2. Control arrangement
 3. Induction motor



LINEAR MECHANICAL ACTUATOR





CONTROL ARRANGEMENT

- Control motor during upstroke and downstroke
- Determination of motion parameters
- Detects a fault condition and apply corrective action
- Provides real time monitoring of production and performance data



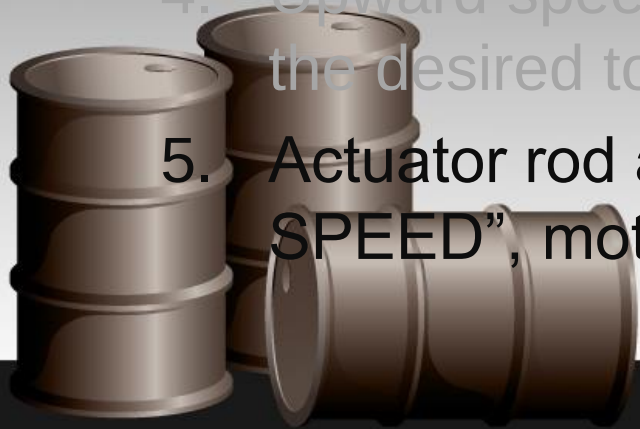


LRP connected with control arrangement



METHOD OF OPERATING

- Include the following eight steps:
 1. Actuator rod in a fully lowered position
 2. The motor is then energized to accelerate the rod to a predetermined „UP SPEED”
 3. Monitoring the output signal of the stationary position sensor
 4. Upward speed of the rod decelerates to the zero at the desired top of stroke position
 5. Actuator rod accelerates to a „DOWN SLOW SPEED”, motor is operated in braking mode



METHOD OF OPERATING

6. Monitoring the output signal of the stationary position sensor
7. Actuator rod is decelerated to zero velocity at the desired bottom of stroke position, motor is operated in braking mode
8. Once the actuator rod has reached the bottom, operation is continued by returning to step 2 above, and repeating steps 2-8 for each pump stroke

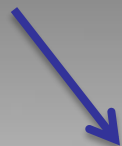


AN EFFICIENT PRODUCTION SYSTEM

- Direct control
- Monitoring
- Economics
- 1 SPM (stroke per minute)



INSTALLATION

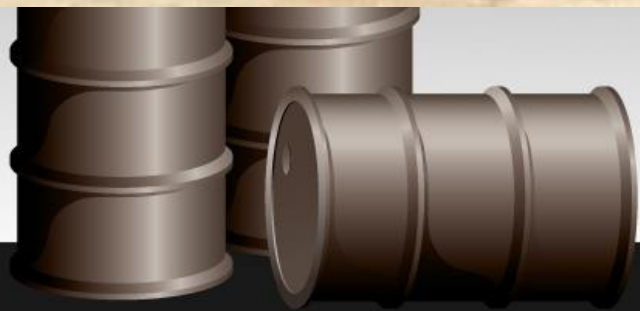


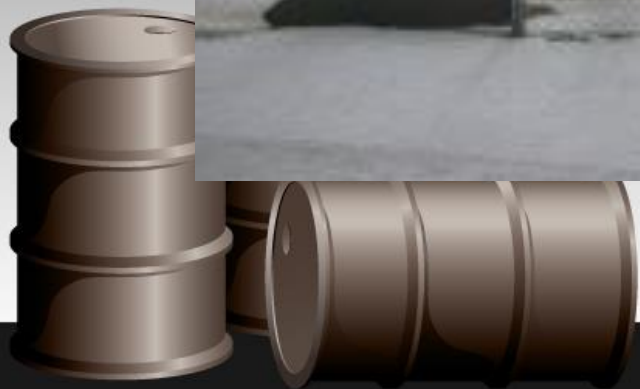
Linear Rod Pump





Comparison of LRP and Walking beam





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CONCLUSION

- Significant advantages over walking-beam type pumping unit
- High system efficiency
- Revolutionary concept in the oil industry
- Application in Croatia



THANK YOU FOR YOUR ATTENTION!

Any questions?



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