Reducing Human Error When Select Fire Perforating

MENAPS 16-13

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AGENDA

- Reported Failures
- Objectives of the System
- Safety Benefits
- Service Quality Solutions
- Operational Benefits
- System Overview
- Conclusion
- Questions
Most Common Failures

- ~40% Pinched or nicked lead wire
- ~22% Seal failure
- ~20% Lack of operational confirmation
Objectives of the System

- Added level of safety to prevent surface detonations
- Reduce Human Errors during the loading, installing, and arming process
- Ease of use for operational efficiency
- Reduce footprint for extended laterals with an increase in perf clusters
- Advanced technology for today’s perforating market
Safety Benefits

- Added level of safety
  - Electrically unarmed
  - Protection up to 500V

- RF SAFE

- API RP 67 Compliant

- Third Party Tested
Safety Benefits

- Shorter length of tool string - 4-6” per gun connection
- Reduce the number of tandem connections
- Lighter weight of tool string
- Reduced the number of pinch points
- No exposed detonating cord
Service Quality Solutions

- Failure - Pinched or nicked lead wire
  - Solution - Eliminate wires

- Failure - Seal Failure
  - Solution - Eliminate ports and tandem subs
  - Reduce the number of connections

- Failure - Lack of operational confirmation
  - Utilize proven intelligent electronic select-fire system
Operational Benefits

- Box by pin expendable hollow carrier (EHC)
  - No tandem subs
- No required auxiliary hardware clean up
- No wires in the assembly
- No pre-wiring required
- Charge tube is the electrical conductor
- Reduced loading time
- No charge clips or pull over tabs on charge tube
System Overview

- Insulated shape charges and charge tube
- End to end ballistic transfer between detonator and det cord / bi-direction booster
System Overview

- Pin to pin contact with no wires required
- Pressure bulkhead, detonator, and intelligent electronic switch in one package
System Overview

- One piece plug shoot adapter and firing head adapter to reduce length and electrical connections
- Uniformed outside diameter quick connection with reduced length
System Overview

- Allows more guns to be run with reduced tool string length
- EHC can be easily downloaded as the job scope changes
Conclusion

- System mitigates up to ~82% of reported failures and problems in select fire perforating
- Creates RF Safe, API RP 67 compliant, and proven operating gun system
- Advanced technology in the current market situation
- Ease of Operations in the field
QUESTIONS?
THANK YOU!