GameChanger Disappearing Gun – Phase I

Project Execution by:-

TNO innovation for life

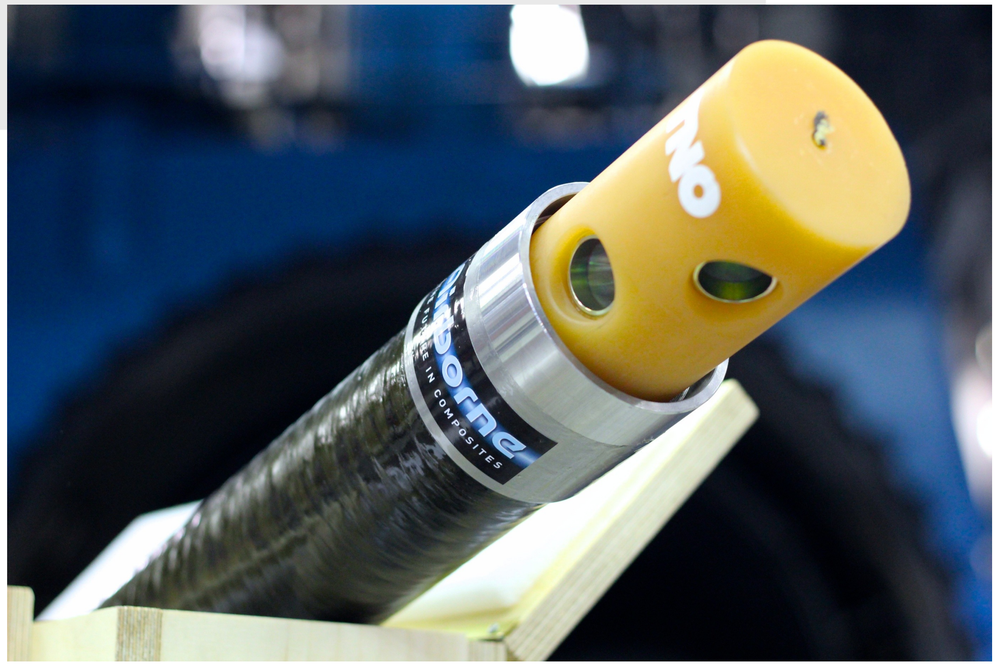
Airborne

Charges Supplied by:-

DYNAenergetics

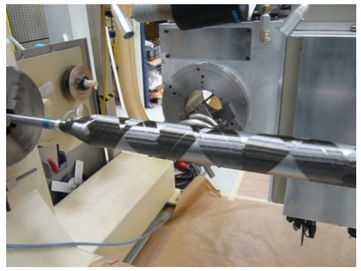
Project Aims

- Gamechanger Project - develop a gun that could be run on completion and disappear – important for horizontal wells with post perf shoot & pull reservoir damage and for fast well turnaround
- Example savings offshore of 2 rig days at $1 million plus per day
- Design of propellant core which supports the CFRP housing
- Production of Potassium Sulphate Epoxy dummy cores for collapse testing
- Determination of confined compression strength of core: s_c > 90 MPa (@ ambient & 150°C)
- Production of Potassium Perchlorate Epoxy propellant core: 75% oxidizer / 25% epoxy (by mass)
- Closed vessel test (@ 225 bar): ~ 50% CFRP disappearance, debris dimensions ≤ 50 x 50 mm
- Selected Airborne for composites and TNO for propellants - to work together – closely located in the Netherlands – charges and technical support supplied by DYNAenergetics – free issue



Phase I

- Propellant system and CFRP gun carrier functioned well and as required in the project scope
- However, debris dimensions equal to or less than 5mm x 5mm suitable for easy return to surface was not fully met – partly a function of the test end caps
- Need to prove that it is possible to produce a design that makes very small, relatively light debris
- Propellant very strong
- Too much propellant was used which generated higher pressure than would be required for the actual tool
- Used small charges back to back on central det cord
- *Current design requires further project work prior to passing on for product development*



Phase II - Challenges & solutions

- *Phase II GameChanger funding approved*
- Challenges
  - Reduce CFRP debris dimensions
  - Increase CFRP housing strength for high external pressure at higher temperature
  - Reduce propellant energy
- Solutions
  - Reduce amount of propellant and increase oxidizer ratio
  - Optimize det cord & shaped charge configuration – larger zinc charges – high spf
  - Self supporting CFRP housing
  - Full scale testing
  - StimGun Consortium involvement

Co-authors

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FROM BETTER TO BEST

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