

COPERNIC

COst & PERformaNces Improvement for Cgh2 Composite Tanks

Duration:

From June 2013 to May 2016

Application Area:

Transportation and refueling infrastructure

Budget:

3,4M€ / FCHJU contribution: 2M €

Partnership / consortium list:

Coordinator: CEA

An interdisciplinary team composed of European research institutes (CEA, WRUT) and industrials (SFC, RAIGI, SSA, GHR, H2Logic) with strong expertise in material and pressure component design, manufacturing processes, numerical modeling, FCEV integration, and H2 refilling.

Summary / main objectives of the project:

- Increasing the maturity and competitiveness of innovative CGH2 manufacturing processes evolving from classical automotive manufacturing technologies or concepts.
- Decreasing costs while improving composite quality and/or manufacturing productivity using optimized composite design, materials and components.
- All-in-one innovative high pressure on-tank valve development and certification (benchmark, price and normative requirement analysis)

Technical accomplishment / progress / result:

- First tanks market survey (benchmark, price and normative requirement analysis)
- First set of performances, durability and cost targets defined
- First set of enhanced material and reference tank design have been identified
- First comparative assessment of conventional Vs robot-assisted filament winding equipment started
- First protocol evaluation in progress



Contribution to the Programme Objectives:

	State-of-the-art	Expected progress
Enhanced materials	Toray carbon T700 Epoxy resin Metal insert SS or Al	- Performance/cost efficient design using innovative materials and design - Decrease cost of inserts by 5
Optimized composite design	Bottle geometries Non representative modeling for thick composite	- Quantification of ultimate accessible performance on model cylinders - Improved composite design (target 15% weight carbon fibre saving)
Manufacturing process	Wet winding High human operation Perf. variability Environmental Issues	- Highly repeatable automated winding - Increase quality, consistency and productivity - Quantify wet winding / prepreg winding performance and cost achievements
Tank components	Std proprietary valve Separate P regulators HP piping	- Innovative all-in-one compact lightweight pressure device - No high pressure piping, pressure outlet 10bar
Structural Health Monitoring	Not existing or on devpmt Normative destructive testing	- Develop and embed/integrate OFS strain transducers to monitor on/off board the integrity of high pressure composite cylinders
Test method	R79/2009 (EC406/2010)	- Contribution to the advancement of relevant test methods by generation of accurate data

Future Steps:

- Final performances, durability & cost specifications
- Progress on enhanced material characterization
- Tanks using selected enhanced materials & designs
- Pressure component definition
- Multi-scale modeling of composite lay-ups
- Conception and Modeling of optimized tanks