

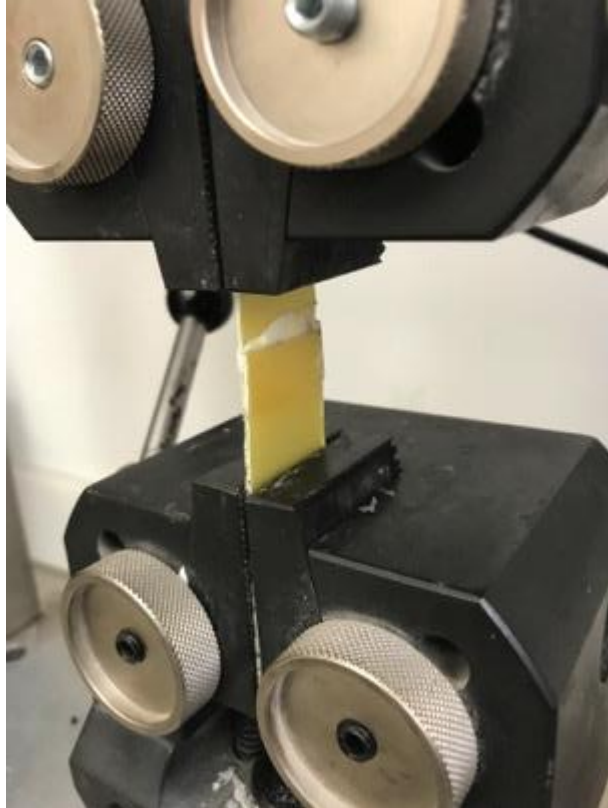
# Development and testing Evaluation of Aerotech epoxy

September 2018

# Independent test laboratory selected for the testing



# Tensometer equipment



# Video of the test



# Test materials

- Epoxy Glass
- Plywood
- Epoxy carbon
- Beech Hardwood

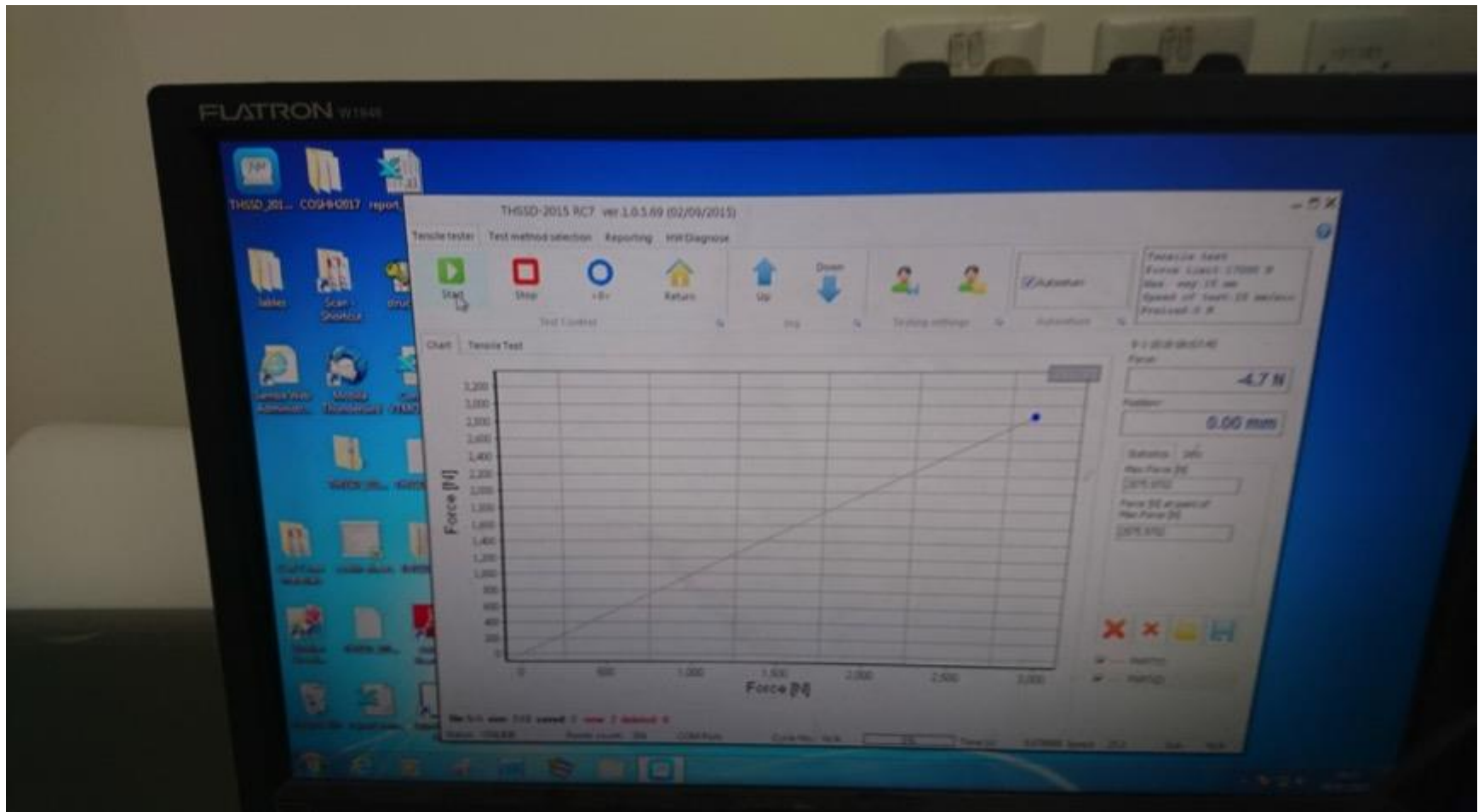


# Test parts preparation

- Parts were cut to size and dry wiped except metal which was solvent wiped.
- All bonds left for min of 12 hours @ 25C before pulling.
- Bonds pulled at 20C.
- Test jig opposite to give consistent glued area.



# Test data recorded on a screen



# Test parts after test

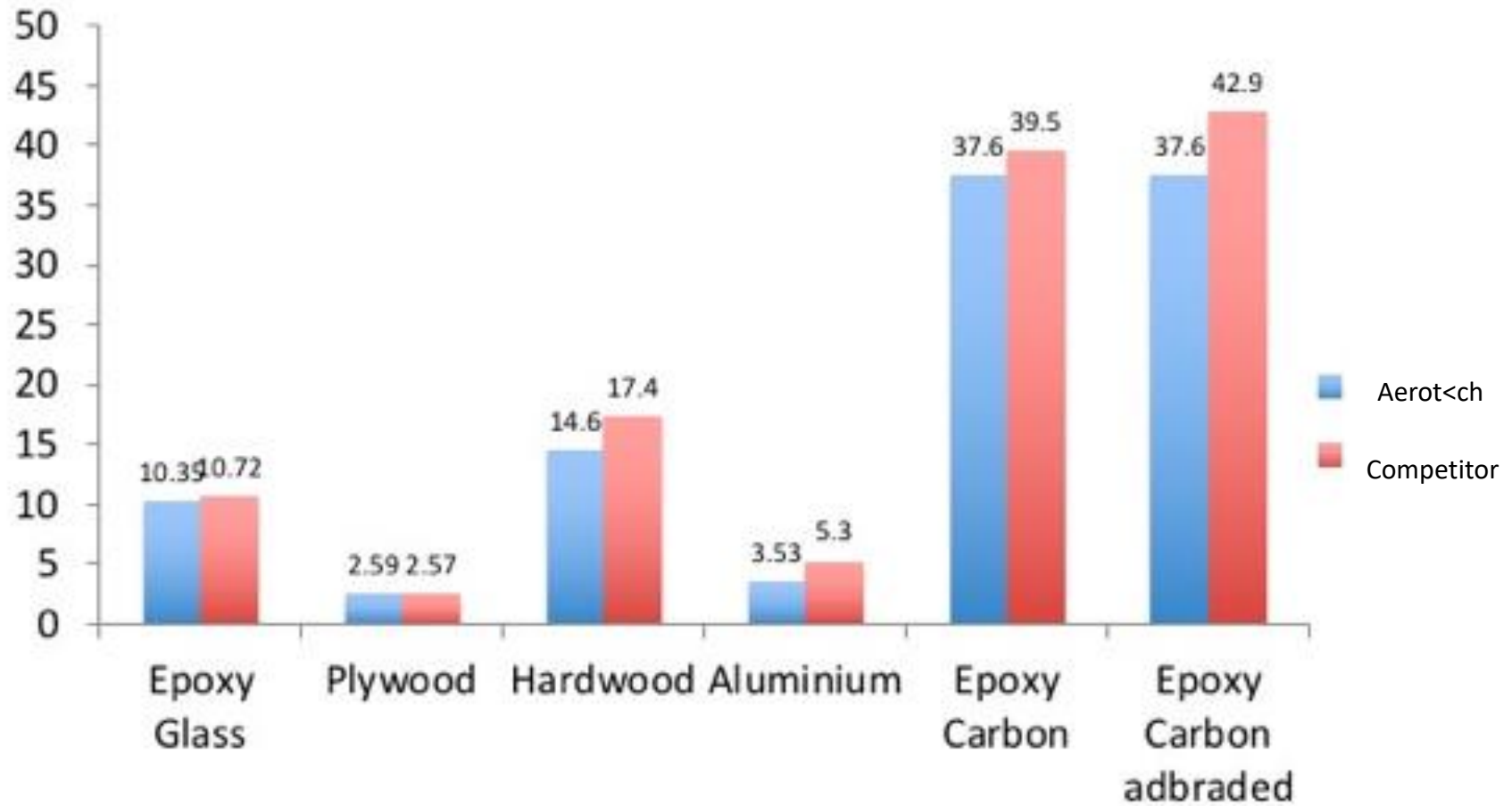




# Results of epoxy glue tensometer tests newtons/ mm<sup>2</sup>:

AeroT<ch versus competitor epoxy

**Note:** Except Aluminium, all tests showed substrate and Not adhesive failure

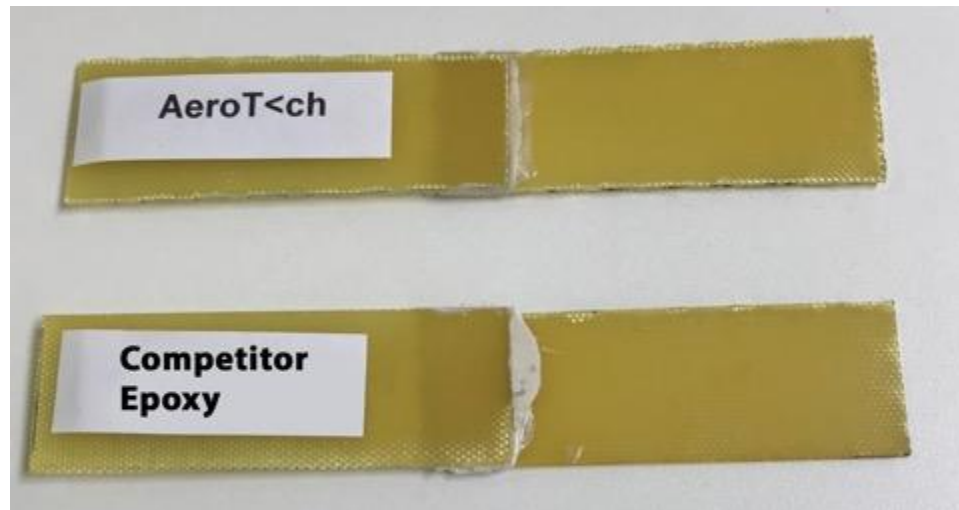


# Test Results

Material	Bonded width	Bonded length	Bonded area Mm2	Break force Newtons		Break Pressure Newtons/ mm		Comment
				AeroT<ch	Competitor	Aerot<ch	Competitor	
Epoxy Glass	25.4	12.5	317	3288	3400	10.35	10.72	Substrate failure
Plywood	25.4	12.5	317	367	365	2.59	2.57	Substrate failure
Epoxy carbon	25.4	12.5	317	591	427	1.86	1.34	Joint failure
Hardwood	12.5	12.5	156	2292	2719	14.6	17.4	Substrate failure
Aluminium	25.4	12.5	317	1121	1683	3.53	5.3	
Epoxy carbon Repeat (Abraded)	25.4	12.5	317	11,948 (11,933)	12,576 (13,648)	37.6 (37.61)	39.5 (42.95)	Substrate failure  (Substrate failure)

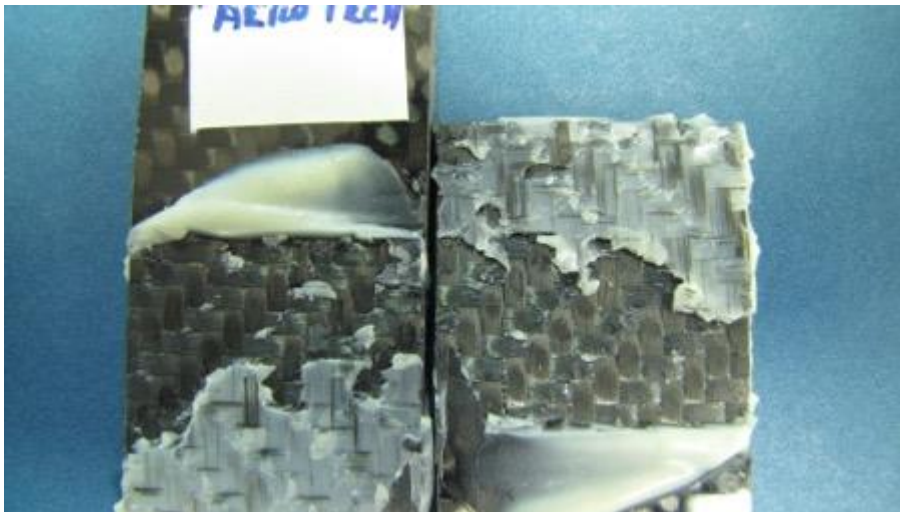
# Test parts after test – Epoxy Glass

- AeroT<ch & the competitor exhibited a very good bond.
- Both products exhibited strength > the substrate exposing glass fibre itself in both cases.
- Small differences were attributable to substrate strength not the adhesives.

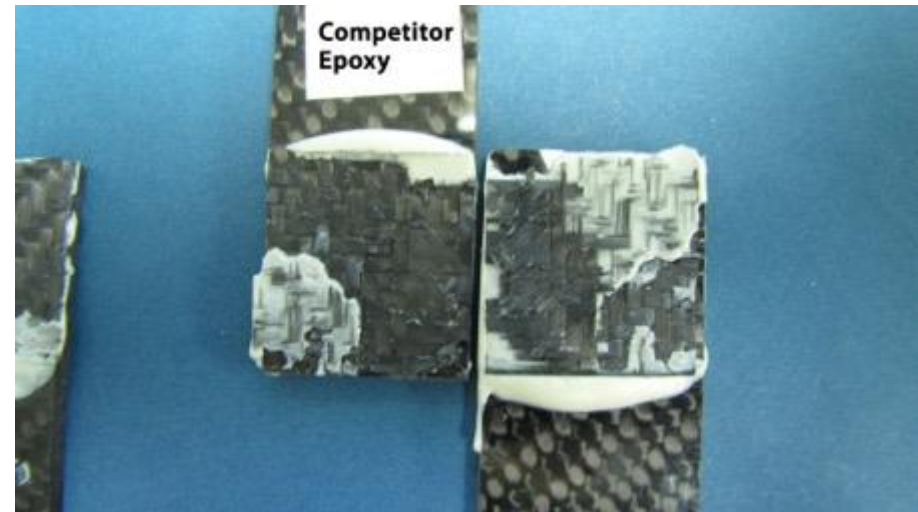


# Post- test Parts Epoxy Carbon

- Both products bonded well
- Both products exhibited strength superior to the epoxy carbon itself
- Surfaces removed ie substrate and not adhesive failure.
- Both products offered similar results 37 and 39 Newtons/ sq mm (over 2.4 ton / sq inch!).

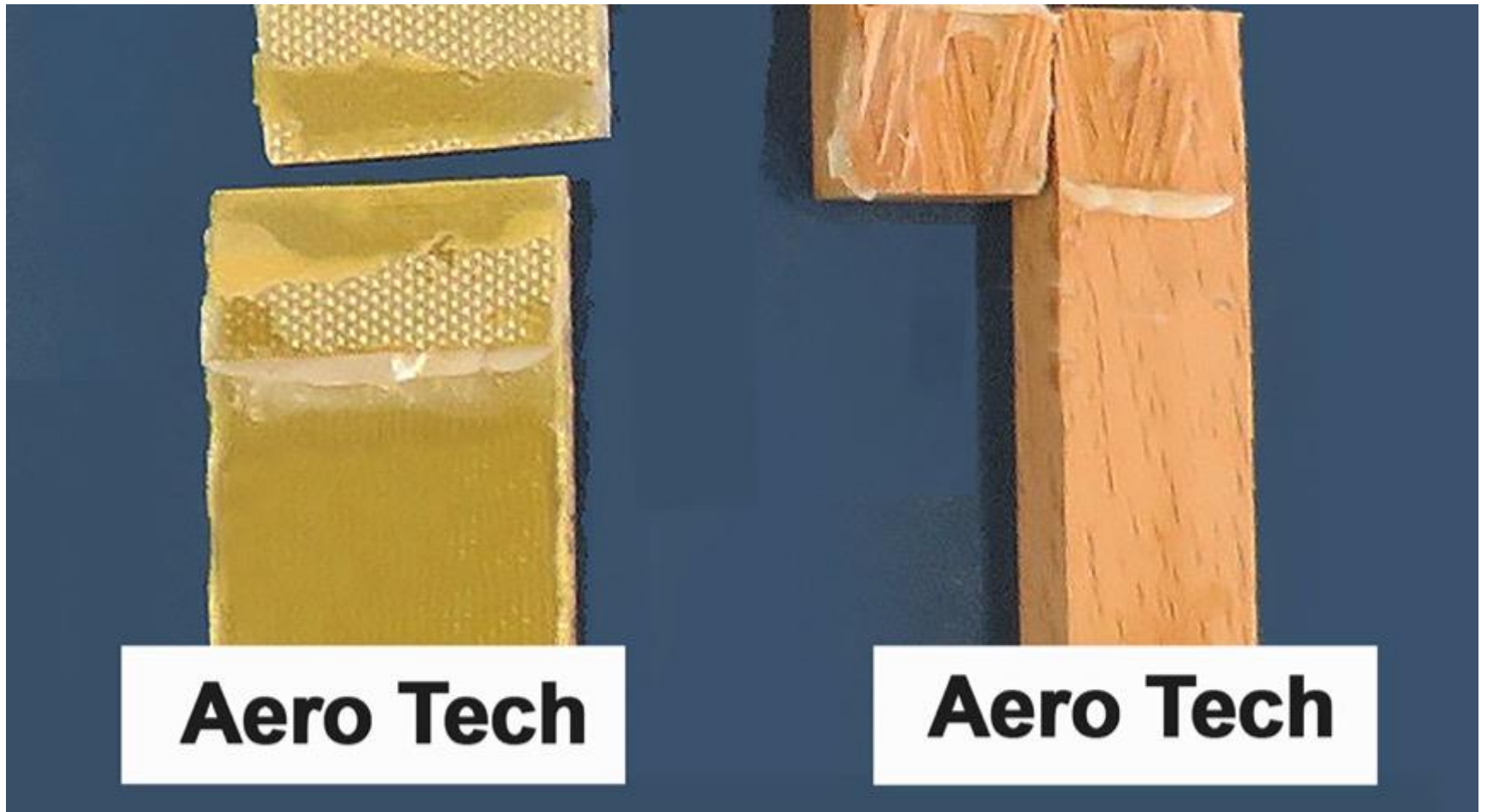


Aerotech Epoxy



Competitor reference epoxy

# Epoxy Glass & hardwood -substrate failure



# Conclusions

- Aerotech epoxy and the competitor offer very good adhesion to a wide range of modelling materials including epoxy glassfibre, carbon fibre and wood.
- The bond strength of both products exceeds that of the materials.
- The test results do not show any real difference in performance of either product.
- Both are good!

# Kerosine fuel compatibility

- After the launch we were advised to test the long term stability of AeroTach epoxy with fuel
- Set up a long term fuel soak test on 14<sup>th</sup> October 2012



# AeroTach Test parts after 5+ years

- All parts showed no visual softening or deterioration.
- Not tested for strength.





# Final Conclusions

- Aerotech epoxy adhesive has shown to have the right qualities for epoxy composite model construction including:
  - High strength exceeding most composite materials
  - Sufficient flexibility
  - Long term kerosene fuel compatibility
  - Combined with its thixotropic quality and visibility in joints it is a good choice for composite model construction.