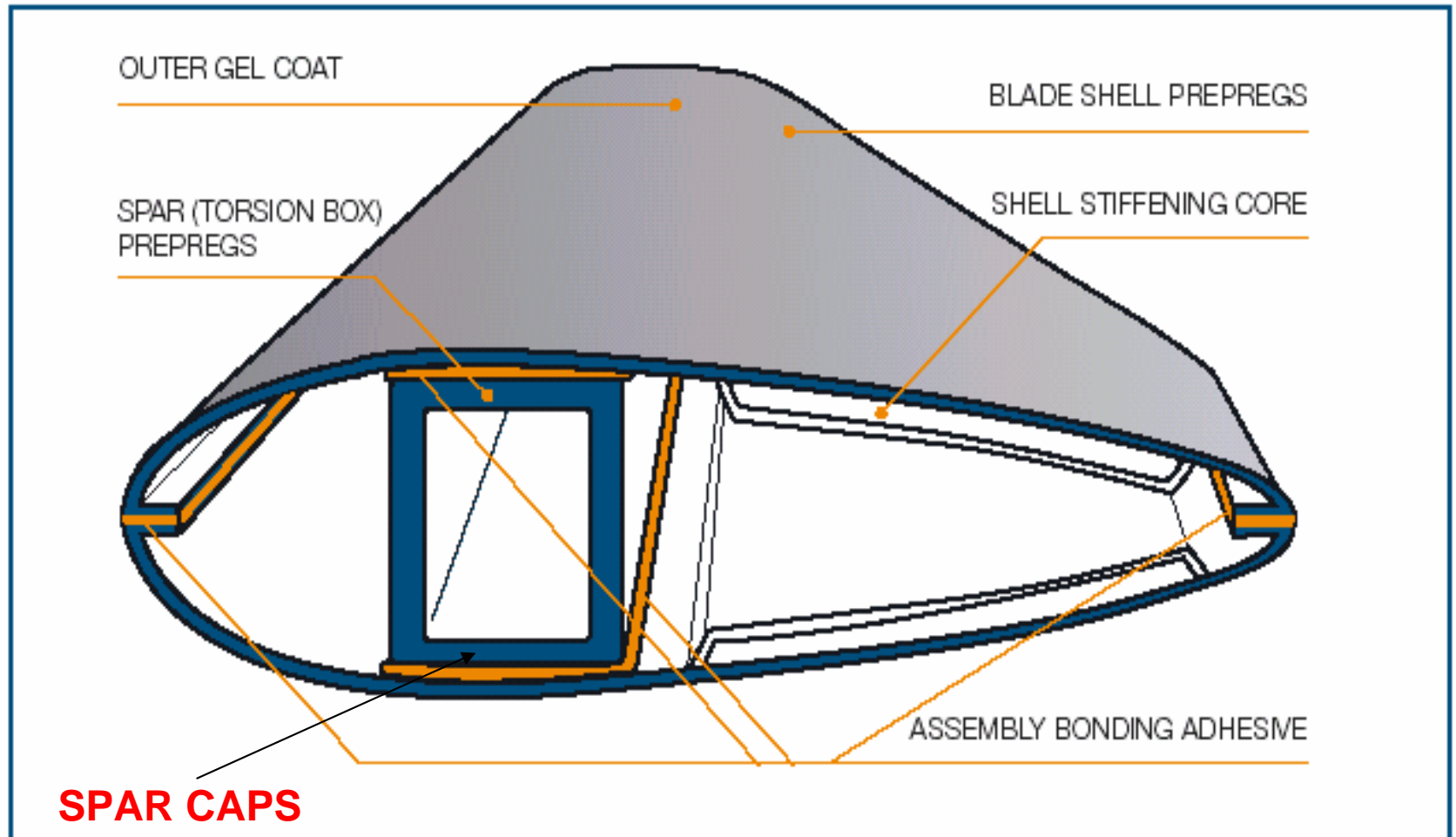


# Wind Energy

Bruno Boursier  
Hexcel

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# Typical Blade Construction



# Cost (Technical) Elements

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- Faster cycle time
  - Less disposable materials
  - Less waste
  - Lower mold cost
  - Less VOC, in US and EU
  - Lower temperature cure
  - Faster lay-up: thicker/lighter/fewer plies
  - Better surface finish/gel coat (lower labor)
  - In process/on line NDE
  - Robust materials & processes for “on site” manufacturing
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- ❑ Design allowable: from test coupons to sub-elements to real parts, for static and fatigue
  - ❑ Effect of plies drop-offs
  - ❑ Co-curing multi-axial glass /UD Carbon
  - ❑ Compression testing of UD: strain & fatigue
  - ❑ NDE: laminates + bond lines
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- ❑ Low voids content with vacuum processes
  - ❑ Lightning strikes protection
  - ❑ De-Icing, Anti-Icing
  - ❑ Repair techniques
  - ❑ Health -and control- monitoring
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