Taklimat Teknikal Kegagalan Tangki Air GFRP SMK Paka

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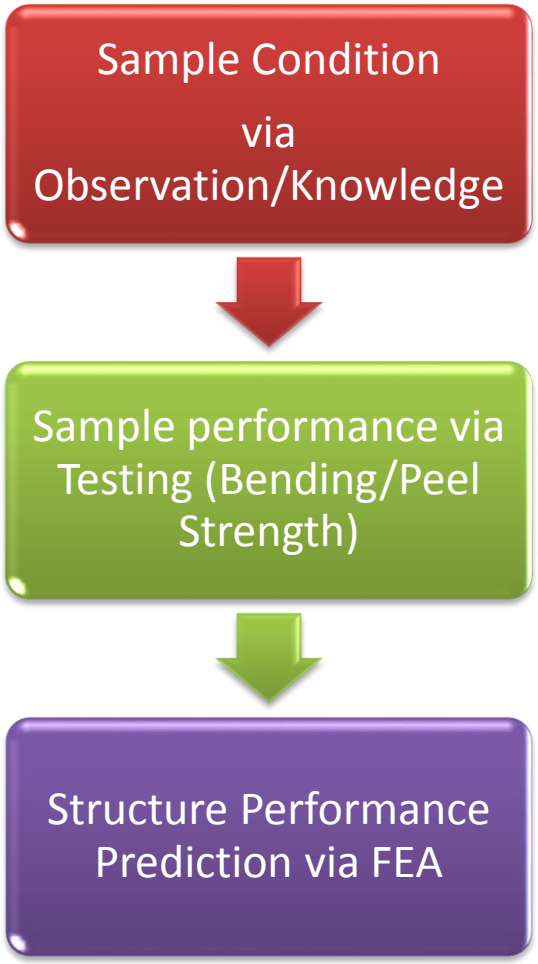
Kandungan Taklimat

- Methodologi Penyiasatan
- Kronologi Konsep Pembinaan tangki GFRP
- Punca Kegagalan
- Cadangan Tindakan Susulan

Investigation Methodology



Konsep Pembuatan Tangki GFRP Selinder

- Konsep Asal (BLT Australia sekitar 1990an)
  - ➢ Flatsheet (Jointless) Method - tank design thickness laminate at site.
  - ➢ Atostech Method 1 (wall to wall segment joint) - Approximately 70% of tank wall design thickness produced at factory and remaining design thickness produced/laminate at site
- Atostech Method 2 (wall to wall segment joint).... 100% tank wall thickness produced at factory. Wall to wall joint using GFRP laminate at site. **Been used for SMK Paka before!**

Punca Kegagalan Tangki

- **Kaedah Pembuatan Tangki (Tank Construction)**

➢ Poor wall to wall joint

➢ Poor wall to bottom joint

- **Kualiti Antara-Permukaan Laminasi (Laminate Interface Quality)**

➢ Poor surface preparation at site

Invite moisture/water to ingress within laminate joint interface

In long-term operation, this could produced debonding between the laminate (i.e. between primary laminate and secondary laminate) that will deteriorated structural integrity.

- Resin weak/lost (reduced stress transfer from fibre to fibre)
- Hydrostatic pressure (hoop and lateral stresses) that accelerate the crack/debonding (failure) process

- **Poor external and internal surface coating**

- Microcraking on wall surface due to poor coating (gelcoat). No maintenance or regular inspection during service. Hot/wet tropical weather accelerates the process of defect.
- Water/resin diffused into internal surface
- Unsealed edge (wall bottom and some other parts of the tank). Study shows, reduction of about 11% of flexural strength and modulus in 300days immersed/exposure to water (moisture ingression)

Ringkasan dan Tindakan Susulan

- Tangki-tangki menggunakan konsep pembuatan Atostech2 adalah dianggap tidak lagi selamat dan amat merbahaya (**red alert**) berdasarkan kepada tahap permerhatian kepada kes kes sebelum ini melalui sampel sampel yang telah gagal.
- Bina tangki baru

Penutup

- Open for further discussion

Demo Bonding CFRP-Concrete