CERAMIC TILE ARRAY ENCAPSULATION WITH THERMOPLASTIC

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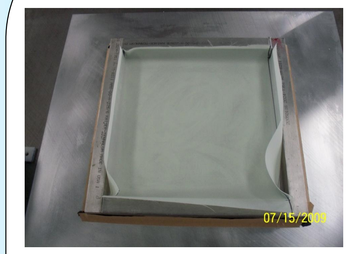
OBJECTIVE

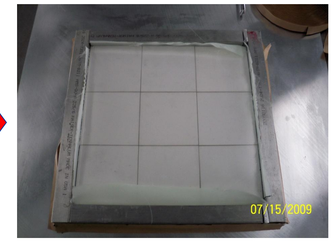
- Encapsulating/Bonding alumina tile arrays with appropriately chosen thermoplastic polymers can significantly improve the performance of ceramic composite hybrid structure.
- Tile encapsulation as a pre-forming stage would offer consistent and complete coverage of the tile and would ensure that the infusion resins do not contact the tile
- A process is desired to fully encapsulate tile in a given thermoplastic that will fall within required tolerances to guarantee a good fit in the overall ceramic composite hybrid panel

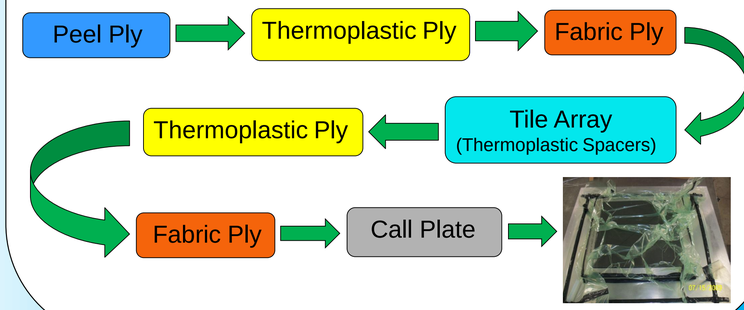
Mold Materials

- Small scale tests for possible mold candidates
- Aluminum is the best choice
  - Rigid enough to give finished dimensions within tolerances
  - Releases from thermoplastic with ease when peel ply is used
  - High Temperature capability

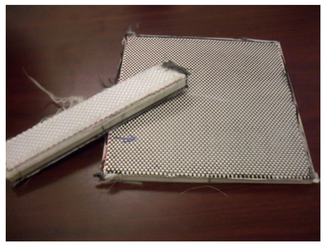
Lay Up







Process Trial Panels



Future Testing 1

- Peel tests with the thermoplastic and fabric, thermoplastic and tile under different heat and re-heat cycles to determine how the bonds are effected by thermal cycles required for panel processing
- Further sectioning to measure depth of penetration of the thermoplastic into the fabric

Future Testing 2

- Drop Tests on small scale panels with and without the tile encapsulation method to see how the tile reacts
- Make and fully test full scale ceramic composite hybrid panels with the tile encapsulation method

ACKNOWLEDGEMENTS

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