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OBJECTIVE

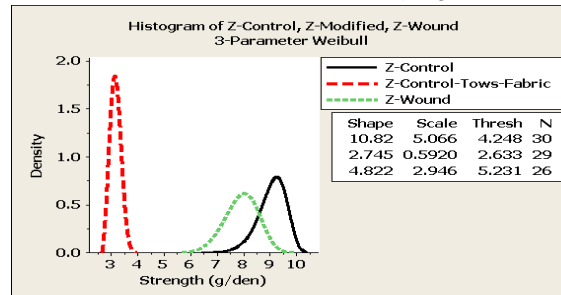
- ◆ Determine effects of weaving on strength retention in S2 glass fibers.
- ◆ Identified sources of damage include abrasion during weaving as well as the curvature of the fibers

PROCEDURE

- ◆ Carefully extract tows from all sub-layers of fabric
 - ◇ Weft Top, Middle, and Bottom
 - ◇ Warp Top and Bottom
 - ◇ Z-tows
- ◆ Impregnate tows with Vinyl Ester 8084 and post-cure
- ◆ End-tab for testing with ASTM Standard D 4018-99
- ◆ Test, then use Minitab to reduce strength data and find peak and mean strength retention

CURVATURE TEST

- ◆ Isolate effects of curvature by wrapping dry control fibers around rod of radius equal to woven fiber radius then test and reduce like impregnated fibers



- ◆ In previous tests, dry z-tows had exhibited strength losses of ~65% with respect to control fibers, which prompted the curvature test. The wound tows only showed a strength loss of ~15%.

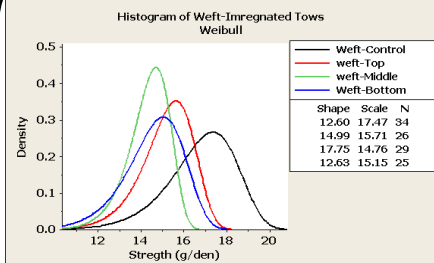
CONCLUSIONS

- ◆ Strength distributions for fibers show overall fiber strength loss of ~10%, with warp having the highest retained strength and Z-tows showing the lowest retained strength.
- ◆ From curvature test, it seems that abrasion is responsible for the majority of the strength loss.

FUTURE WORK

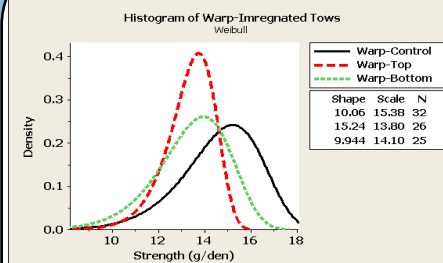
- ◆ Attempt to isolate effects of abrasion on the fibers as closely to what is experienced in weaving process
- ◆ Analyze effects of interaction of the curvature with abrasion

WEFT RESULTS



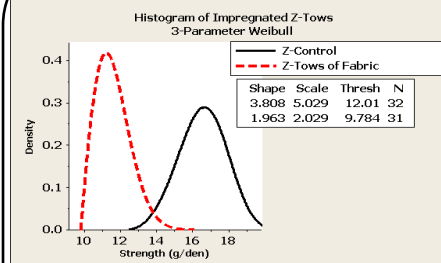
- ◆ With respect to control fibers, peak strength decreased by ~10% for weft top tows and ~14% for weft middle and bottom tows

WARP RESULTS



- ◆ With respect to control fibers, peak strength decreased by ~9% for warp top and bottom tows

IMPREG. Z-TOW RESULTS



- ◆ With respect to control fibers, peak strength decreased by ~30% for Z-tows

ACKNOWLEDGEMENTS

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