

LARGE SCALE PRODUCTION OF
FILAMENT WOUND TUBULAR STRUCTURES

Letter report,

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SUMMARY

Custom built wet filament winding machines will be available for producing drive shaft filament wound structures for automobiles. The production of fibers, carbon and glass, as well as resin, is adequately being expanded. Prospects are that the automobile industry will be required to develop captive capabilities to attain the desired constant supply of drive shafts. It is expected that the joint attachment systems will be different from company to company and independent suppliers will not enter the market.

CONCLUSIONS

1. Capabilities for filament wound constructions are adequately expanding for the expected production in 1982.
2. Customized production filament winding equipment can be built to meet the requirements for fabricating drive shafts well over the 100,000 per year rate.

RESULTS

1. Manufacturers of customized filament winding machines are in general agreement that line production equipment will be needed for fabricating filament wound drive shafts. There is unanimous agreement that wet winding is apparently the most feasible from the cost and high production rate point of view. The expectation is that one winder will take from 6 months to one year to make and put into operation. If straight tubes are fabricated it is expected that each machine will produce from 1,000 to 1,500 shafts per week. Opinions prevail that about 70,000 shafts per machine per year are not unreasonable. The problem to be resolved will be how to attach the joints to the shaft. One opinion was that if a pin-wrapping technique were used and the bond was effected during the co-cure a realistic production rate of about 35,000 per year per machine could be achieved. The costs for the machines were expected to cost anywhere from \$250,000 to \$500,000.

The more versatile tool room or model room types of filament winders can not be economically used. They are geared to achieve greater flexibility and not high production rates.

2. Production rates for the Dragon launch tubes only were available. At peak production, Brunswick produced 9,000 tubes per month. The estimated glass fiber volume, based on density measurements, was 55%. Only weight and wall thicknesses were measured. The quality of the tubes was determined from pressure proof and occasional burst tests.

3. The commercial production of pipe dwarfs the size of any military procurement of filament wound constructions. In 1977, 33×10^6 pounds of pipe under 24 inches in diameter were produced.



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