CHAPTER V

CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

Processing of glass fiber reinforced polypropylene is easily performed by using compression molding technique.

1) Pressure at melting period was applied during processing of the glass fiber reinforced polypropylene with the values of 0, 200, 500 and 1000 psi, respectively. The results can be concluded that pressure at melting period does not significantly affect the flexural properties.

2) Pressure at cooling stage was applied during processing of the glass fiber reinforced polypropylene with the values of 0, 200, 500, 1000 and 1500 psi, respectively. The flexural strength and modulus increased with pressure at cooling stage upto 200 psi and gradually decreased when the pressure was over 200 psi. Thus the optimum pressure at cooling stage should be 200 psi; however 500 psi was used in this study because of limitation of the hydraulic press.

3) In the processing of glass fiber reinforced polypropylene, when the temperature reached 200^{o}C, holding time was varied from 0, 5, 10, 20 and 30 minutes before cooling. An increase in holding time brough about a decrease in flexural strength and modulus. Thus the process was cooled immidiately when the temperature reached 200^{o}C.

4) In the processing of glass fiber reinforced polypropylene, heat (melting temperature) was applied during sheet forming to produce uniform composites. It was found that melting temperature at 200°C gave a maximum flexural strength and modulus. Thus 200°C should be the optimum melting temperature.

5) The glass fiber content in composites greatly affected flexural strength and modulus. The highest flexural strength and modulus was obtained when the composite had 30-40% glass content. Thus 35% glass content was used in this study.

It can be concluded from the above results that optimum condition for compression molding of glass reinforced polypropylene should be 30-40% glass content, melted at 200°C without any applied pressure and immediately cooled under 200 psi pressure. It was found that all of the surface treating agents used in this study showed compatibility enhancement between the glass fiber and the polypropylene matrix, but A-174 and PVA seem to be the most appropriate.

In case of effect of the surface treating agent coated together with coupling agents available on commercial glass fiber, it was found that if the surface treating agent had similar or same functional groups with the coupling agents, flexural strength should be decreased due to the effect of multilayer forming. On the other hand if the surface treating agent had different functional groups or had good adhesion with the coupling agents, flexural strength should be increased.

Accordingly, overcoating the AGI general purpose fiber with the surface treating agents suitable for polypropylene and glass fiber should decrease the flexural properties of the GRP. Inversely, overcoating the surface treating agent on the NEG fiber which was suitable only for thermosetting plastics, the flexural properties of the GRP should be increased.

Moreover, the polynomial regression equation method was also used to calculate the flexural strength and modulus of the GRP. The calculated data was expected to be more reliable and used for discussion all of the effects of surface treating agent on flexural properties of the GRP.

5.2 Suggestions

Due to polypropylene is so susceptible to thermal oxidation even at ambient temperature, antioxidant should be recommended to use as an additive.

Others engineering thermoplastics such as ABS, HiPS, PC etc. are also interested to fabricate with glass fiber and new coupling agent should be investigated for acceptable compatibility between the both.

Injection molding of the composites having more feasibility than compressing molding is also interested, but chopped glass fiber and special injection molding machine are recommended to use.