CHAPTER 5

CONCLUSION AND SCOPE FOR FUTURE RESEARCH

5.1 EVALUATION OF AA 6061

- On the evaluation of AA 6061/graphite and AA 6061/B₄C composites for its ability to develop resistance to wear, it is observed that the AA 6061/graphite composite exhibits about 18 times lower wear rate with 5 wt. % of graphite under all load conditions. In the case of the AA 6061/B₄C composite, the material exhibits about 45 times lower wear rate with 10 volume % of B₄C content under all load conditions.

- It is also observed that, the wear rate noticed with 10 volume % of B₄C in AA 6061/B₄C composite is lower compared to the AA 6061/graphite composites.

- The mechanical property of AA 6061/graphite composites is lesser with 5 wt. % of graphite content compared to AA 6061 alloy and it is higher than that for 10, 15, 20 wt. % of graphite. For the AA 6061/B₄C composites, the mechanical property increases with the B₄C content and with 10 volume % of B₄C, it is higher compared to AA 6061 matrix material.
It can also be noticed that the AA 6061/B₄C composite exhibits better wear rate and mechanical properties with 10 volume % as compared to the AA 6061/graphite composites.

5.2 EVALUATION OF AA 7075

- The wear rate behaviour of the AA 7075/graphite composite shows 26 times lower wear rate with 5 wt. % of graphite compared to the AA 7075 alloy under all load conditions.

- The wear rate of the AA 7075/B₄C composite also exhibits 52 times lower wear rate with 10 volume % B₄C compared to the AA 7075 base alloy under all load conditions.

- The wear rate of the AA 7075/Al₂O₃ composite is 32 times lower with 6 wt. % compared to the AA 7075 matrix alloy under all load conditions.

- As regards the AA 7075/Al₂O₃/graphite hybrid composite, the wear rate is 42 times lower with 2 wt. % of Al₂O₃ content, compared to the matrix AA 7075 under all load conditions.

- It is observed from the above, that the AA 7075/B₄C composites exhibit a lower wear rate with 10 volume % of B₄C content compared to others.

- The mechanical property of the AA 7075/graphite composites is lower with 5 wt. % of graphite content compared to the AA 7075 alloy and AA 7075/B₄C composites with 10 volume % of B₄C content.
• The mechanical property of the AA 7075/Al₂O₃ composites is higher with 6 wt. % of Al₂O₃ content compared to the AA 7075 alloy and AA 7075/Al₂O₃/graphite hybrid composites with 2 wt. % of Al₂O₃ content.

• On comparison, the AA 7075/B₄C composite shows a better wear rate and mechanical property with 10 volume % of B₄C content, compared to the other composites.

5.3 EVALUATION OF AA 6061 AND AA 7075

• From the above analysis, it is observed that the AA 7075/B₄C composite with 10 volume % of B₄C content exhibits good potential for developing wear properties, which are relatively lower, compared to the AA 6061/B₄C composites.

5.4 SCOPE FOR FURTHER RESEARCH

In the current research, the ability of the alloys AA 6061 and AA 7075 to develop self-lubricating property with consequent resistance to wear has been studied at ambient temperature conditions. These alloys would be further explored for identifying their capability to develop and sustain self-lubricating property and resistance to wear under temperature conditions in the further research.