CHAPTER V

CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

The objectives of this research are to find the proper composition of NR/EPDM blends for coating on iron crossarm. The vulcanized blends must be of high insulation, must withstand ozone and thermal ageing to meet the suitable physical and mechanical properties for the TOT's network. The proper composition of NR and EPDM was determined by investigating the effects of the carbon black concentration on electrical properties of rubber blends, of the homogenizing agent concentration on compatibility between NR/EPDM blends, and of the ratio of NR/EPDM blends on the extent of ozone resistance. The insulation coating must have a volume resistivity of more than 10^{11} ohm cm. Thus, at most 10 phr of carbon black in blends is suitable for an insulation coating material. However, 3 phr of carbon black was found to give higher tensile strength and suitable volume resistivity. The lower carbon black concentration decreases mechanical properties after ageing. We found that after 30 phr silica had been added, the mechanical properties of blend after ageing was improved. The compatibility of NR/EPDM blends was improved when homogenizing agent was added. The smoother phase dispersion of blends can be seen by SEM. The positive deviation of the blends was only found when the homogenizing agent (Ultrablend 4000) of 5 phr was added, which confirmed the blend compatibily of NR and EPDM. Moreover, the pulsed NMR results indicated that the spin-spin relaxation time (T_2) of all three components of the rubber blend was compressed upon the addition of the homogenizing agent. The gradual increases in tensile strength and elongation at break of

blends were observed when 3 and 5 phr of the homogenizing agent were added, respectively. On the contrary, mechanical properties were poor when 7 phr of the homogenizing agent was added. The 80:20 ratio of NR/EPDM blends filled with silica can withstand ozone gas at 50 ppm. Inclusion of silica not only increased thermal and mechanical properties of blend, but also improved the ozone resistance of NR/EPDM blends.

The proper composition of NR and EPDM, which inherents the requirments of high insulation, antiozone, and proper physical and mechanical properties suited for the TOT's network is shown as below:

Natural Rubber, phr	80
EPDM, phr	20
Ultrablend 4000, phr	5
ZnO, phr	5
Stearic acid, phr	1.5
Carbonblack (N330) , phr	3
Silica, phr	30
PEG, phr	1
EF44, phr	1
MBTS, phr	1
TMTD, phr	0.3
Sulfur, phr	2

5.2 Suggestions for future work

1) The effect of another type of reinforcement filler and its concentration should be investigated for improved hardness of this compound rubber.

2) Higher NR content of 80 phr in the presence of EPDM filled with silica should be carried out to observe the ozone effect.

3) Compatibilizing effect of the homogenizing agent in NR/EPDM should be further characterized by other techniques, such as TEM or swollen-state NMR.