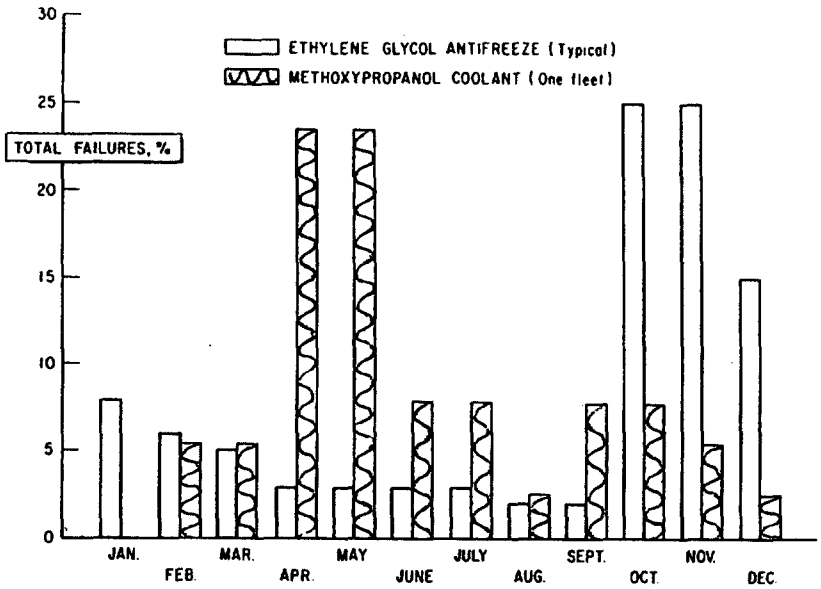


Fig. 13 - Typical seal failure pattern

It should be made clear that both cases described by Fig. 13 are extreme and the average user of either type of antifreeze does not experience this severe seasonal failure rate. However, whenever seasonality of seal failures occurs, it imposes an additional burden on the equipment operator due to loss of availability of many units at one time. Whenever seasonality is severe, it appears to be coincident with:

1. A large number of units with a similar high mileage (and hence seals which are nearing the end of their normal life span).

2. A sudden change from antifreeze/coolant to plain water or vice-versa.

Some operators have found that year-around use of methoxypropanol coolant helps to reduce the seasonality of seal failures. Others simply allow the concentration to decrease slowly by the addition of water as make-up once the danger of freezing is past. Likewise, year-around use of glycol antifreeze should minimize the seasonal pattern of seal failures, and result in a more uniform rate of leakage throughout the year.

SUMMARY AND CONCLUSIONS

1. Different types of elastomers are affected differently by different types of coolant. The general effect can often be estimated by an examination of various chemical and thermodynamic properties of both the elastomer and coolant.

2. Changing the composition of the coolant in contact with a given elastomer causes corresponding changes in the volume of the elastomer.

3. Limited field data indicate that seasonal failure of hoses and seals may be due to a sudden change in the composition of the coolant.

4. From the data presented, it may be reasonably concluded that seasonal failure of nonmetallic components of the cooling system can be minimized by avoiding sudden changes in the composition of the coolant.

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