

CFD Analysis of gear box for different oil viscosity

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Abstract

In this paper study has been carried out on the different oil having different viscosity which is affecting the performance of gear box which is measured with the help of velocity diagram. For that a model of gear box is generated with the help of pro-e and analysis is carried out in ansys software.

1. Introduction

In this paper thermal analysis of gear box is carried out for different viscosity oils. For the analysis purpose design of maruti Omni's gear box is used. Compression of thermal analysis is done for different viscosity oils as listed below

- 1) SAE 85W 140
- 2) SAE 80W 90
- 3) SAE 75W 90
- 4) SAE EDIB

2. SAE 85W 140

Properties of SAE 85W 140 is listed below

SAE 85W 140	properties
API gravity	26.0
Viscosity at 40° c	352
Viscosity at 100° c	25.5
Viscosity index	100

These properties are inserted in ansys and CFD analysis is done. The result of CFD analysis is shown in figure 1.

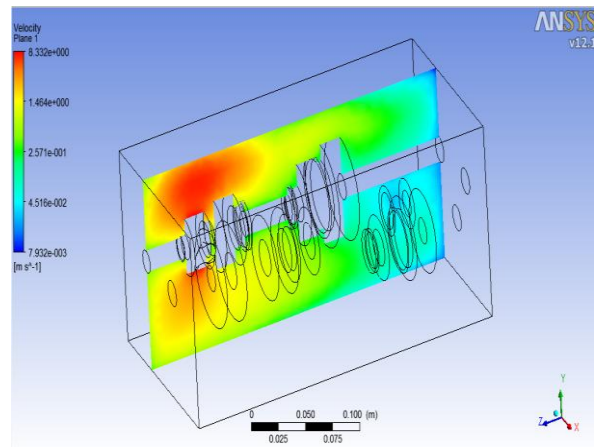


Fig. 1 Velocity diagram in gear box using SAE 85W 140

From the Fig.1 velocity difference found 24.71 Cst

3. SAE 80W 90

Properties of SAE 80W 90 is listed below

SAE 80W 90	properties
API gravity	27.5
Viscosity at 40° c	130
Viscosity at 100° c	14.0
Viscosity index	100

These properties are inserted in ansys and CFD analysis is done. The result of CFD analysis is shown in figure 2.

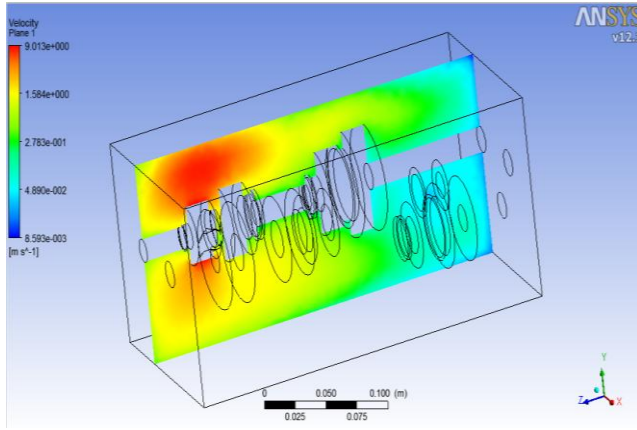


Fig. 2 velocity diagram in gear box using SAE 80W 90

From the Fig.1 velocity difference found 24.5 Cst

4. SAE 75W 90

Properties of SAE 75W 90 is listed below

SAE 75W 90	properties
API gravity	
Viscosity at 40° c	129.7
Viscosity at 100° c	16.6
Viscosity index	137

These properties are inserted in ansys and CFD analysis is done. The result of CFD analysis is shown in figure 3.

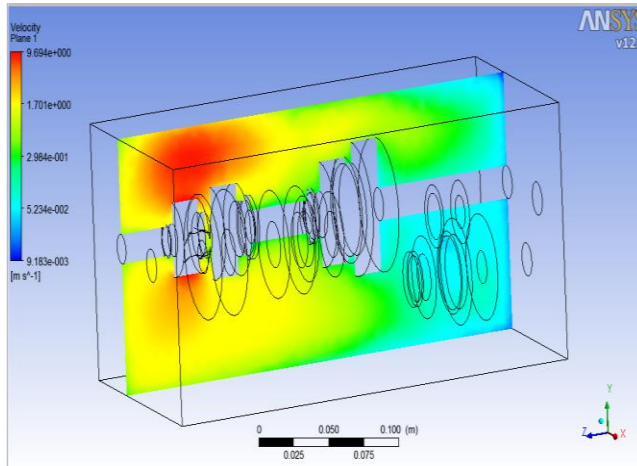


Fig. 3 Velocity diagram in gear box using SAE 75W 90

From the Fig.1 velocity difference found 23.2 Cst

5. SAE EDIB

Properties of SAE EDIB is listed below

SAE EDIB	properties
API gravity	26.0
Viscosity at 40° c	35.2
Viscosity at 100° c	25.5
Viscosity index	100

These properties are inserted in ansys and CFD analysis is done. The result of CFD analysis is shown in figure 4.

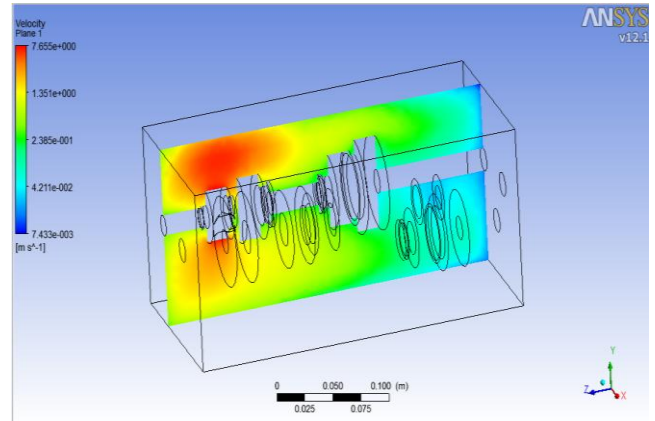


Fig. 4 Velocity diagram in gear box using SAE EDIB

From the Fig.1 velocity difference found 25.14 Cst

6. Conclusion

From the above result it is observed that the maximum velocity difference is in the case of SAE EDIB oil. So it is more desirable to prefer SAE EDIB as an engine oil.

7. References:

- 1) ANSYS V 12.1
- 2) Pro-E Wild Fire
- 3) www.peakantifreeze.com