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KISSsys Instruction: Definition of the Lubrication through a Table

1 Introduction

Normally all gears and bearings in the same gearbox uses the same oil. When type of the lubrication, temperature or oil itself is changed it doesn't make sense to do that all sedately for every calculation. The lubricant, the lubrication method and the temperature of the lubrication can be therefore be easily defined through a table. The information is used later, in the calculation of the gears and the bearings.

2 Solution

A list with all available lubricants and methods of lubrication are posted in the user interface table. The choice of the two informations and the used lubrication temperature are referenced in a global variable for each of the three inputs. The detailed bearing calculation should be enabled (according to ISO281-1) to have an influence for the bearing lifetimes. The KISSsoft calculations use the global variables and through that the defined values of the lubrication.

2.1 Table definition

It is recommend to use always a table with same name in all the models. E.g. table named "Settings" can be used to do the lubrication selections. Copy - paste table "UserInterface" from your "templates.ks" to create a "Settings"-table.

2.2 Definition of the Global Variables

First define the three variables with a right click on the table "*TableName*" then "*New Variable*", choose the type of the variable and define its name. It is recommend to use same names for the new variables as they are in the calculation modules.

Name of the variable	Type	Explanation
<i>TypeOfLub</i>	<i>List</i>	For the method of lubrication: splash-, injection-lubrication and dry-run.
<i>Oil</i>	<i>Database List</i>	Lubricant from the KISSsoft database.
<i>LubTemp</i>	<i>Real</i>	Temperature of the lubricant.

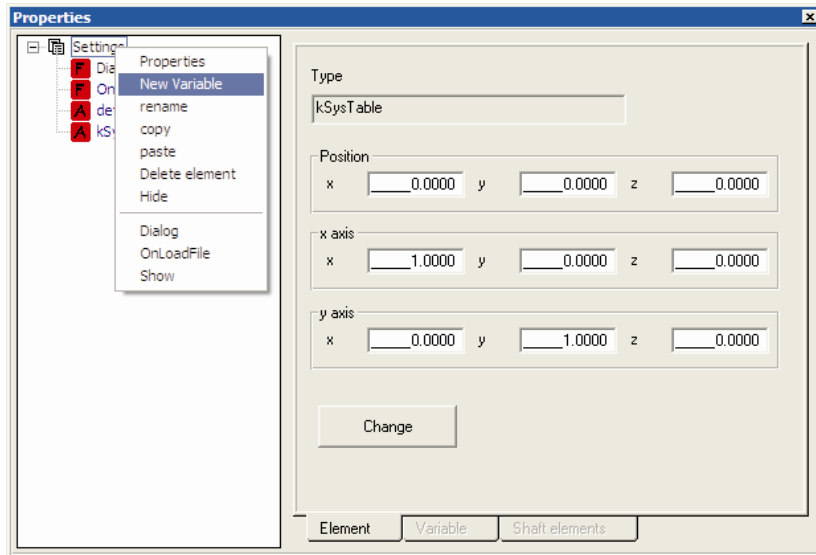


Figure 2.2-1 Defining new variables

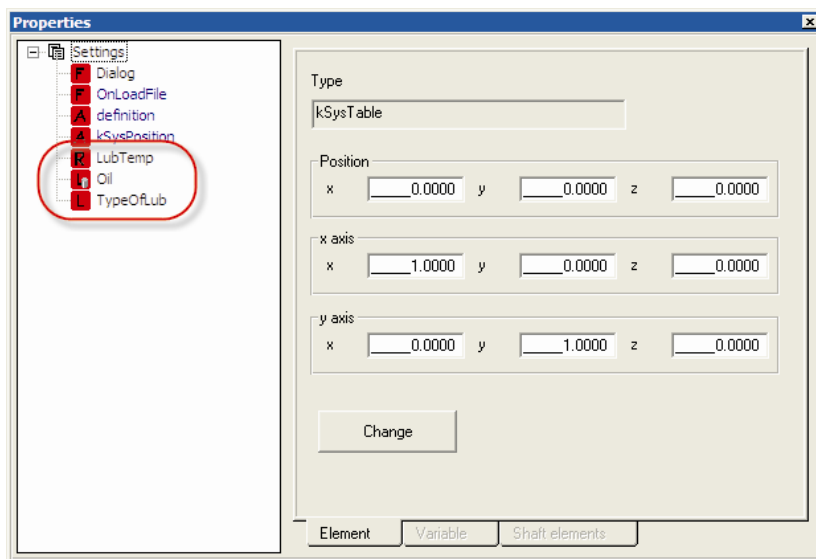


Figure 2.2-2 Defined new variables

The two variables “*TypeOfLub*” and “*Oil*” are lists. “*TypeOfLub*” is defined locally and “*Oil*” will be defined using the KISSsoft lubricant database. The content of the lists is still to be assigned to the variables.

- For the method of lubrication, variable “*TypeOfLub*”:
Right click on the Variable “*TypeOfLub*”, choose Edit List, and introduce the following list in the appearing window:

["oil bath lubrication", "oil injection", "Grease lubrication", "Dry-running"]

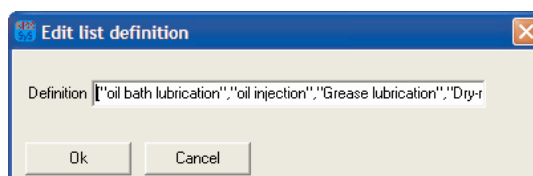


Figure 2.2-3 Defining list of lubrication methods

- For the lubricant, variable “*Oil*”:
Right click on variable “*Oil*”, *Edit List* and define as follows:

["KMAT", "KLUB"]

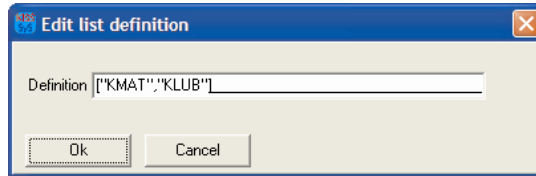


Figure 2.2-4 Database list definition

“KMAT” tells the program that it is a part from the KISSsoft data base. “KLUB” defines which part of the data base (lubricants) is to be addressed.

Last variable “*LubTemp*” is “Real”-type of data and therefore need no separate definition.

2.3 Data Choice / Input with the User Interface

2.3.1 The choice of the lubricant

How to introduce a reference to the database for the lubricants (“*Oil*”) in the “Settings” table? Right click in the cell of the “Settings” table, choose “*Insert database list*”, “*Reference*” and introduce the name of the variable “*Oil*” between hyphens. Because the lubricant is only defined for KISSsys, do not activate the flags. Note! If you have defined the variable in some other table than where you want to display it, use also the name of the table in the field “Reference to”.

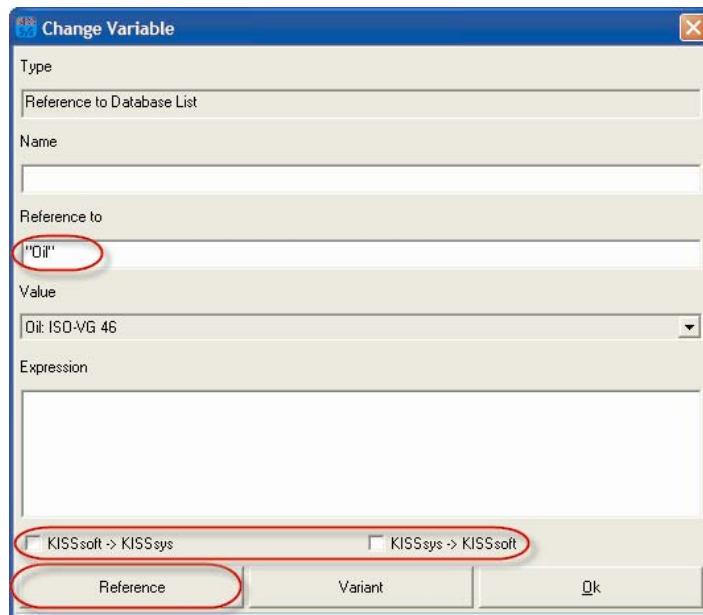


Figure 2.3-1 Defining reference to the database list

The lubricant can now be chosen in the “Settings” table. A double click on the corresponding cell shows the selection list.

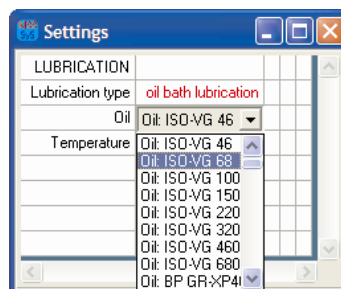


Figure 2.3-2 Choose the oil from the list

The chosen oil or grease is saved in the variable “*Oil*”.

2.3.2 The choice of the lubrication method

The same procedure should be followed as with the definition of the lubricant, but with the creation of the reference on the variable “*TypeOfLub*”.

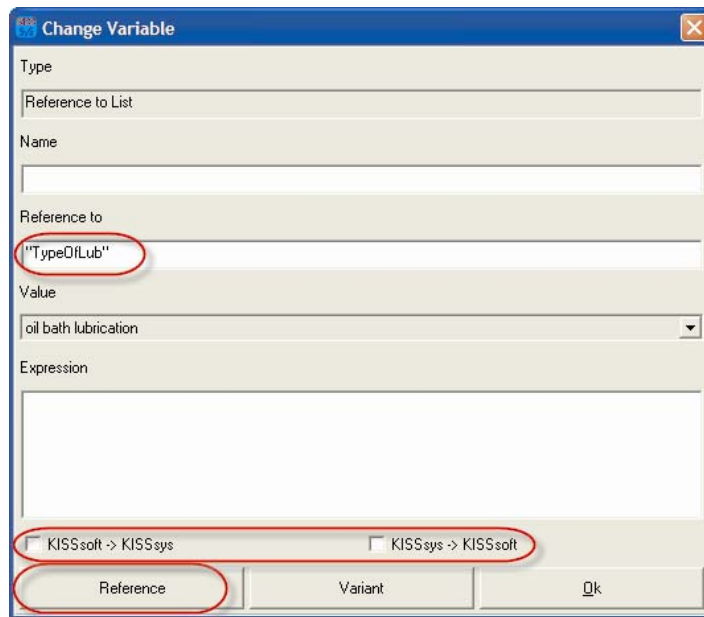


Figure 2.3-3 Defining reference to the list

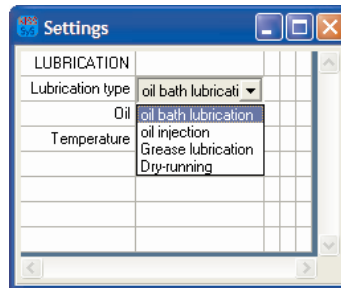


Figure 2.3-4 Choice of the lubrication method from the list

2.3.3 The introduction of the lubrication temperature

Right click in the “*Settings*” table on the cell, “*Insert real*”, “*Reference*” and introduce the variable “*LubTemp*”. Because the lubricant is defined only in KISSsys, do not introduce the flags.

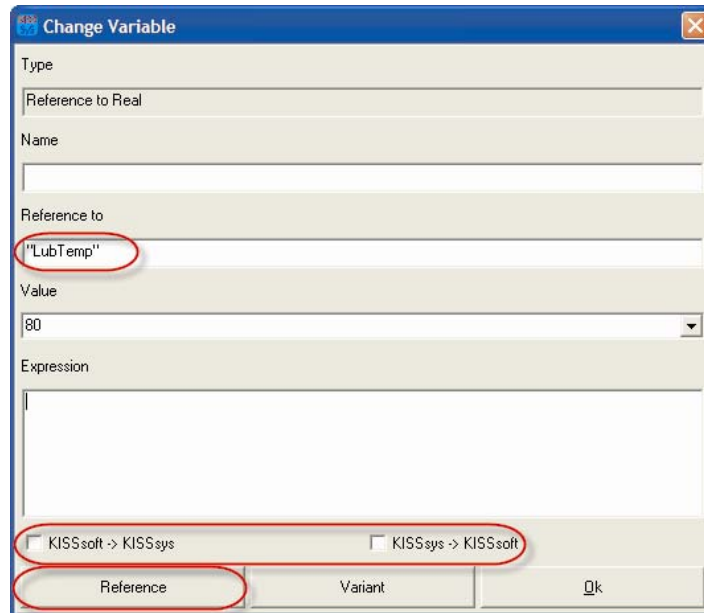


Figure 2.3-5 Reference to lubrication temperature

2.4 Transfer of the Lubricant to the Calculations

Note! In some cases the names of the variables may be confusing, follow the instructions accurately.

2.4.1 For the Gears

- Transfer of the lubricant

The gear calculations have a variable “*Oil*” (for the lubricant). The value of the variable “*Oil*” has to be equal to the variable “*Settings.Oil*”. To assign “*Oil*” the value of the lubricant, introduce “*Settings.Oil*” in the field “*Expression*”.

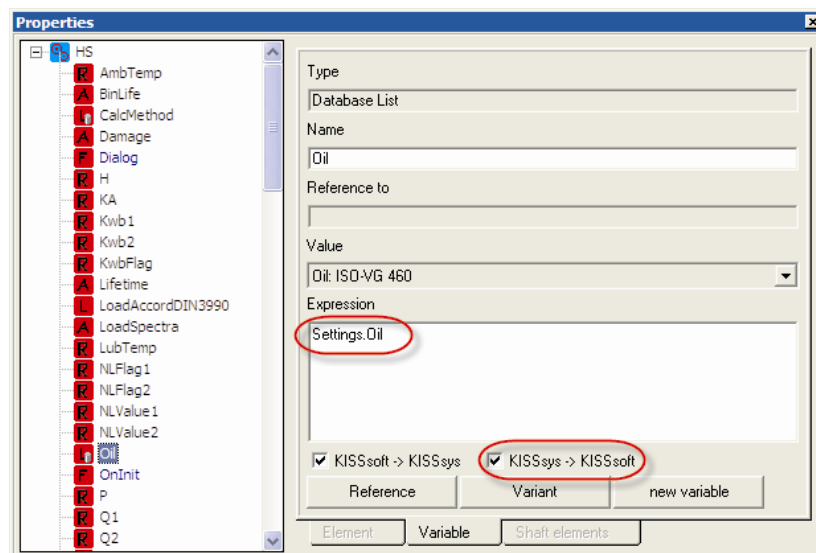


Figure 2.4-1 Link to the “Settings” - table

The flags have to be put in this manner, because the lubricant is defined in KISSsys and not anymore in KISSsoft. This has to be repeated for every gear calculation in the model.

- Transfer of the lubrication method

The same way as above, but with the variable “*TypeOfLub*” in the field “*Expression*”.

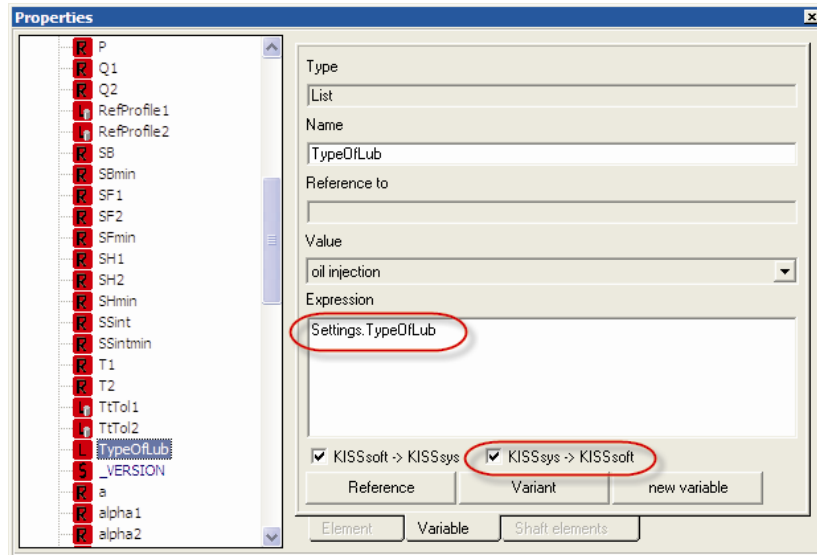


Figure 2.4-2 Link to the lubrication method

- Transfer of the lubrication temperature:

Follow the same procedure but with the variable “*LubTemp*”, and “*Expression*” “*Settings.LubTemp*”.

2.4.2 For the Bearings

The names of the variables are the same for the bearing calculation as for the gear calculations. Therefore the same procedure has to be taken, for the definition of the lubrication temperature and the kind of lubricant, for every bearing calculation in the model. Note that the third variable “*TypeOfLub*” does not exist for the bearing calculation.

The introduction of the lubricant is useless, if the bearings are not calculated in extended lifetime calculation for bearings (using FAG or ISO method).

2.5 Extended Lifetime Calculation for Bearings

KISSsoft calculates bearings along different methods: Standard method (L10), FAG and according to appendix 4 or ISO281-1. To define method, using the user interface proceeds as follows:

Define under “*Settings*” a variable “*enhanceLifeCalc*” of the type “*List*”:

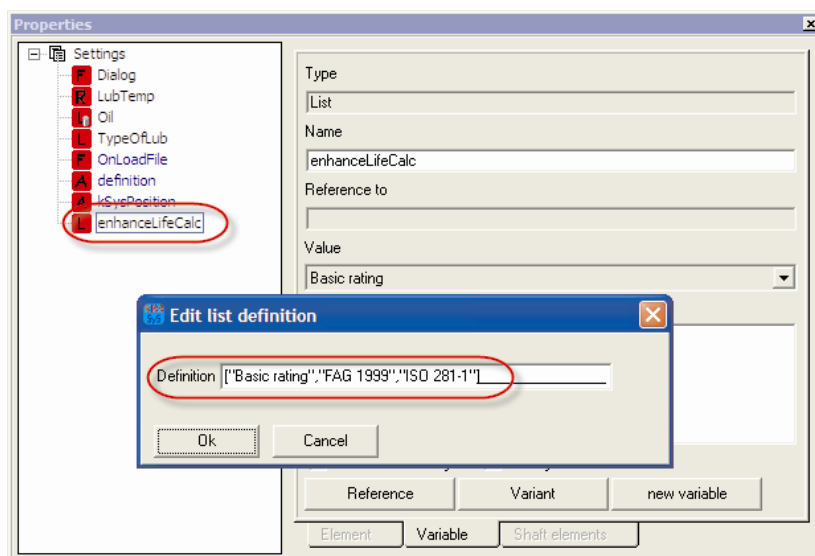


Figure 2.5-1 Defining enhanceLifeCalculation method list for the bearings

The list entries needs be defined also. *Right click* on the variable “*enhanceLifeCalc*” choose “*Edit list*” and enter following line in the appearing window:

["Basic rating", "FAG (1999)", "DIN ISO 281-1"]

The list can be introduced now in the “*Settings*” table. Create in the table a reference to the list “*enhanceLifeCalc*” similarly as made in lubrication definition. *Right click* on the empty cell, choose “*Insert List*”, activate “*Reference*” and put the variable name in the field “*Reference to*”.

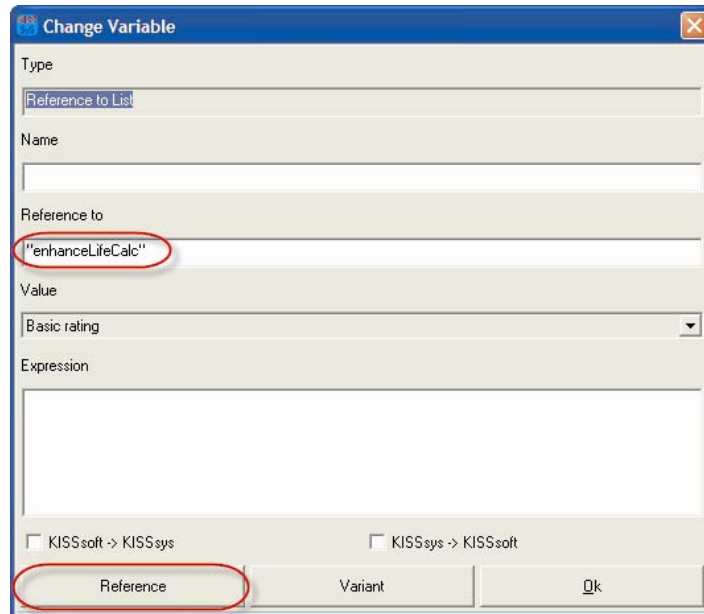


Figure 2.5-2 Creating access to select bearing calculation method

In this field of the “*Settings*”-table, after a double click, appears the list with the different possible choices of the calculation method (Which is saved then under variable “*enhanceLifeCalc*”).

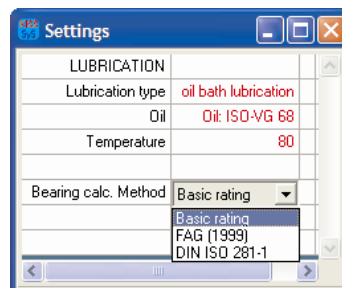


Figure 2.5-3 Selecting bearing calculation method from the list in "settings" table

The variable “*enhanceLifeCalc*” must now be introduced in the variable “*enhanceLifeCalc*” of every bearing calculation. This grants that the calculation method is applied to the bearing calculation. The flags should be set as follows because the method of calculation is set from KISSsys.

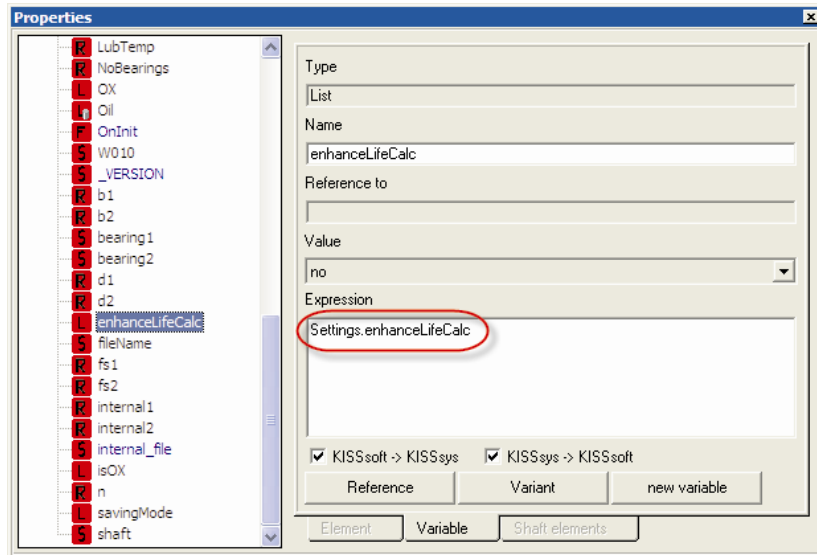


Figure 2.5-4 Expression for the bearing calculation method selection from the "Settings" table

2.6 Contamination selection for bearing calculations

The influence of the lubrication contamination on the bearing lifetime is introduced directly in KISSsoft. Double click on the bearing calculation, choose under “*General data*”, “*Lubrication*” and select the cleanness from the list. “*Calculate F5*” has to be pressed to take all the values to KISSsys. When you want to select value freely, select “*Own input*” from the list and introduce value for the “*ec*”. In this case it is possible to control the impurity value “*ec*” from the KISSsys, but it requires some special arrangements. See more information from the instructions for “*TranslationTable*”.