

04.3E Sensitivity Analysis

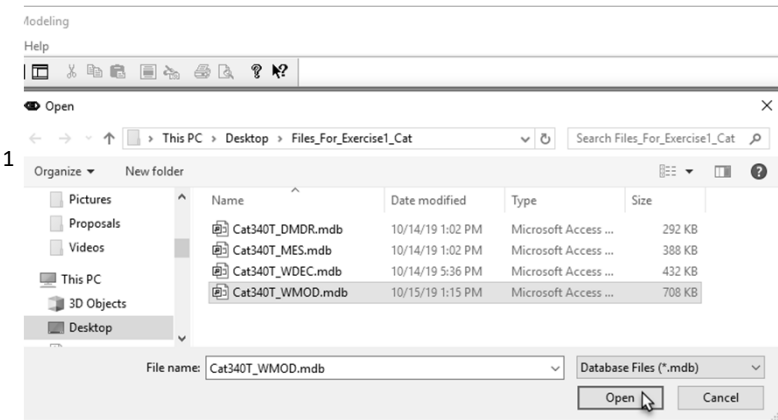
How accurate does our **business data assumption** need to be?
Sensitivity of reported performance to the $(C+K)/C$ ratio?

The ratio of the long run **cost of mitigating** the failure consequences to the expected **cost of failure** dictates the productivity of the CBM policy.

We need to know the impact on performance of **errors** in this ratio.

1

Revisit Exercise 1



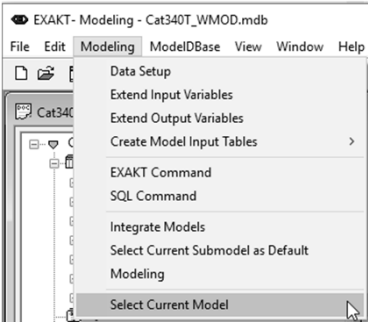
We want to verify the sensitivity of CBM performance to deviations from the assumed $(C+K)/K$ ratio.

1. ExaktM, File, Open, Navigate to folder \Files_For_Exercise1, Cat340T_WMOD.mdb, Open

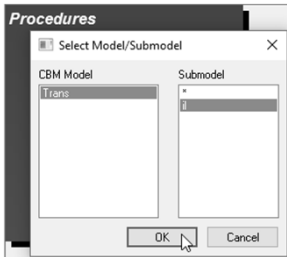
2

Select the model whose business data is to be assessed

1



2



Select the model.

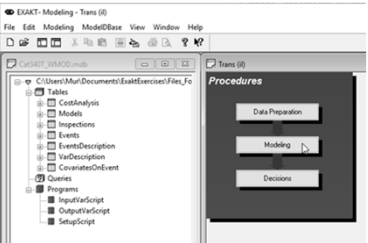
1. Modeling, Select Current Model

2. il, OK

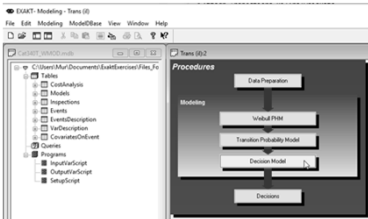
3

Invoke modeling function


1



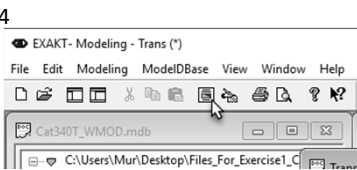
2



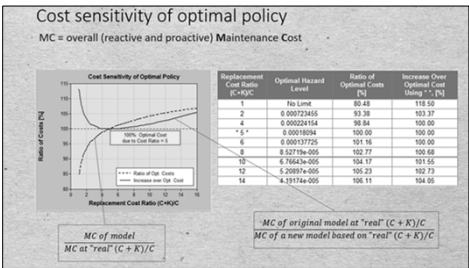
3



4

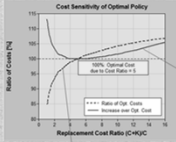


5



Cost sensitivity of optimal policy

MC = overall (reactive and proactive) Maintenance Cost



Replacement Cost Ratio (C/K)	Optimal Hazard Level	Ratio of Optimal Costs (%)	Increase Over Optimal Cost Using "Real" C
1	No Limit	80.48	118.50
2	0.00072445	93.38	123.17
4	0.00024154	98.84	100.00
6	0.00019725	101.16	100.00
8	0.00196005	102.77	100.68
10	0.00243600	104.17	101.55
12	0.002974e-005	105.23	102.73
14	0.003744e-005	106.11	104.05

MC of model

MC at "real" (C + K)/C

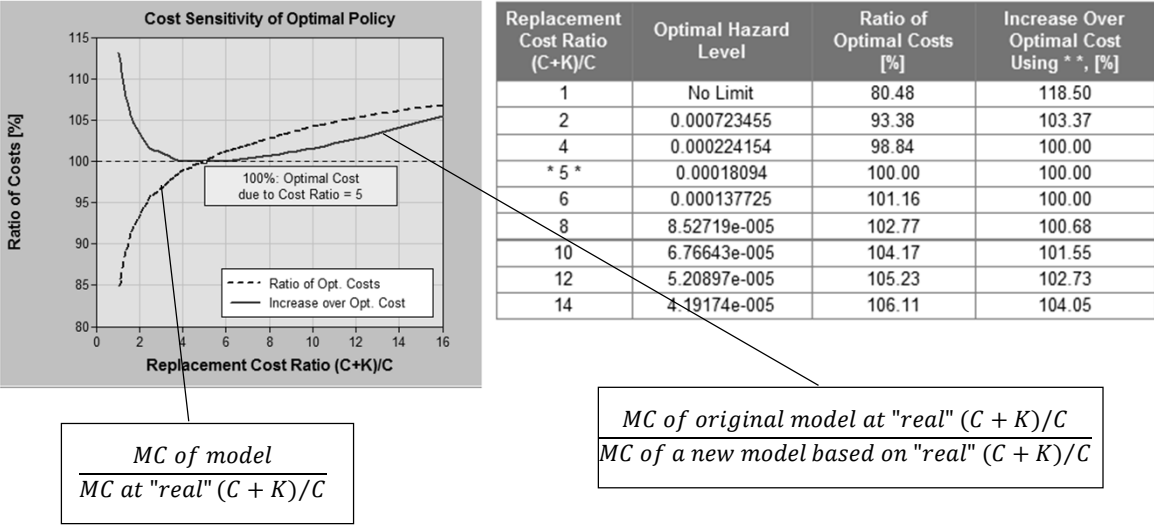
MC of original model at "real" (C + K)/C

MC of a new model based on "real" (C + K)/C

4

Cost sensitivity of optimal policy

MC = overall (reactive and proactive) Maintenance Cost



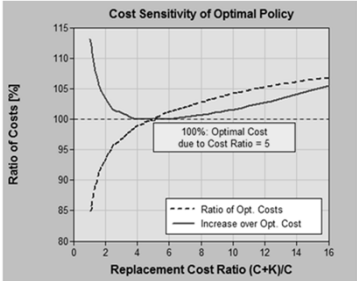
5

Conclusions

1. The red curve tells us that changes in the real (C+K)/C ratio within the range of 4 to 7 will not affect model optimal performance.

2. This defines the accuracy needed in our cost ratio estimate

3. Periodically the Reliability Engineer verifies whether the business factors have changed and rebuilds the model with the new ratio.



6