CASE STUDY – 2 DIFFERENT MODELLERS, 2 DIFFERENENT RESULTS

BACKGROUND

13 years ago a company was commissioned to analyse a river system with extensive stopbank overflows. Some landowners were convinced the results and recommendations did not make sense with reality. They commissioned their own report from another company. The modelling was done using the same information and same software package. The results were very different. The consequences in following either set of recommendations would be high in terms of costs and environmental impact. How does this get resolved and who pays?

MODEL COMPARISON

The 2 experienced modellers sat together and went through a checklist of the potential differences in the models. It became clear very quickly that they were doing things based on different information sets even though they were told differently.

DIFFERENCES IN THE MODELS

Altogether were 14 obvious differences in the 2 models that would make a difference in the final results. Here are the top 6.

1 Channel cross-sections shapes:

Model A used data directly downloaded from surveyor's database. Model B used the "official" hardcopy survey given to the client.

Consequence: Modeller B used only 70% of the survey points and the channel capacity was generally reduced by 15%.

2 Cross section chainages do not match and thus the Reach Lengths were different

Model A used GIS adjustment after the survey. Model B used the chainages calculated by the surveyor.

Consequence: Model B was 2km longer

3 Overflow pocket representation

Model A did not utilise these physical features. Model B used them.

Consequence: Model B introduced a further 10% flows back into the river through the outlet culverts.

4 Extent of the River Network

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Model A limited upstream boundary to the river gauge site. Model B went 3km upstream beyond this site and included a large storage floodplain.

Consequence: Calibrated peak flows and water levels where different by 15% and 250mm respectively.

5 Different spilling locations

Consequence: Model A spilling volumes were greater upstream which affected final recommendations.

6 Improvement Methodology

Model A used a 5-year design flow. Model B used the statistics of the 7 major floods to understand how protection could be improved.

Consequence: Model A average spillways were increased by 15% while Model B reduced spillways by 20%.

CONCLUSION

Neither model was wrong (or right) but was different due to actual data received, the tools used, the decisions on model structure, interpretation on how to use the calibration etc. The **final major consequence** was that it took the client many years to resolve and at great cost to fix.

COULD THIS HAVE BEEN AVOIDED

This case study demonstrates how 2 competent people can give quite different results.

Issue # 1; Could have been avoided if the actual model cross-sections were tabulated in a technical report appendix. Model B should have asked for original survey data. This would help to future-proof the work if the same river was analysed in 20 years time.

Issue # 2; There were no plans showing the survey cross-section locations against modelled. Same solution as # 1.

Issue # 3; Model A should have tested the pockets hydraulics to see how it changed the river flows. Modellers should have been told to talk to landowners.

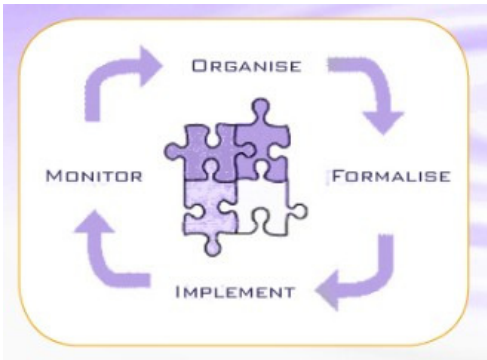
Issue # 4; Modellers should have been told to talk to landowners to see if the upstream floodplain boundary area was influential and if uncertain should have been tested.

Issue # 5; Compounded consequence of issue #2

Issue # 6; The client should have been informed about the remedial methodology before it was done.

FINAL COMMENT

Hindsight is a wonderful thing but mistakes need to be learned from and not repeated. Ultimately the problem was the lack of formal cohesion between the Project Brief and the Modelling Methodology applied. A **Modelling Policy Statement** would have considered many of the issues at the beginning of the project to ensure the final work was robust, was agreed by the client, was based on the same data and give better communication between stakeholders.



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