

MANUFACTURING SIMULATION IN PRACTICE:
SUGGESTIONS FOR ESTABLISHING CREDIBILITY
An Extended Abstract

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1. INTRODUCTION

In an earlier work (see Feltner and Weiner (1985)), some aspects of the relations between modelers and manufacturing engineers (M.E.'s) were explored. The focus of this presentation is on establishing both modeler and model credibility. Nine areas of importance for a modeler wishing to establish credibility are explored in the form of suggestions for a successful modeling project. Examples from the authors' experiences as modelers in a manufacturing environment will be used in the presentation to illustrate these suggestions.

In general, M.E.'s have their own problems to solve and they rarely have the time, training, background or inclination to learn about the details and elegance of a particular model or modeling technique. It is up to the modeler to bridge any communications and credibility gaps. The suggestions outlined in this abstract are designed to help bridge those gaps. These suggestions are designed to place the modeler into the manufacturing camp, rather than draw the M.E. into the modeling camp.

2. SUGGESTIONS FOR IMPROVING THE CREDIBILITY OF MODELS

Suggestion 1: Maintain a Problem (manufacturing) Focus, Not a Technique Focus.

In general, M.E.'s are interested in obtaining relief from their problems, not in any particular modeling techniques which are used. They are interested in "what" works, not "why" it works.

Suggestion 2: Build the Right Model with the Right Information.

The right model for the job is not always the one which is asked for. The successful modeler will develop a skill for knowing what information to ask for to define the process to be modeled and will be able to provide guidance as to what can and should be expected from the model by the M.E.'s. This may require that the modeler acquire some basic understanding of the process to be

modeled before attempting to build the first model.

Suggestion 3: Get the Right Data to Drive the Model.

The credibility of a model is judged by the results it predicts, not by the accuracy of the data which drives those results. The modeler must make sure that the right data is obtained to drive the model. In particular, beware of "book" data, "future" data, and manned operation data.

Suggestion 4: Report Output Results in Terms of what the Manufacturing Engineer is Used to Seeing.

Credibility is more rapidly achieved if the M.E. can immediately associate with the results. Terminology has a local flavor and this should be learned upfront. While WIP (work in process inventory) is standard in many accounting and engineering circles, it will bring a blank stare from an operations person used to talking about "on-line" and "off-line" storage.

Suggestion 5: Remember that the Manufacturing Engineer Owns the Problem.

To maintain credibility with M.E.'s, modelers must avoid hardselling their favorite solution to a problem. M.E.'s have the difficult job of meeting production demands under any and all circumstances. Steady state rarely exists, and problems associated with launch, shift breaks, etc. can destroy rational schedules and plans. Given this sort of operating world, the solutions selected to problems are those which, by the M.E.'s experience, will not only provide current results but will also avoid future problems. The modeler must remember that "you can't solve a problem you don't own" and that the main job is to provide insights, not solutions.

Suggestion 6: Use Credibility Aids.

Credibility gaps are in reality often communication gaps. Any tool to improve communications can improve credibility. Two

such tools which show great promise are interactive animated simulation and physical models.

Suggestion 7: Develop personal contacts and be patient.

The modeler should have patience. Take the time to learn not only the process to be modeled but also the environment in which the M.E. is working. One way to accomplish this is for the modeler to take the initiative and develop one-to-one relations with the manufacturing personnel involved in the process.

Suggestion 8: Learn the "Mysteries of Manufacturing" and their Effects on Credibility.

Feltner and Weiner (1985) described three mysteries of manufacturing and suggestions for actions to be taken by modelers to avoid being trapped by them and losing credibility. The mysteries are:

- 1) "Where is the decision maker?",
- 2) "Why doesn't the plant believe the data collected?", and
- 3) "Why do second tier plants never seem to meet the authorized demand schedule?".

Suggestion 9: Remember the "Myths of Modeling" and Avoid Disseminating Them.

Along with the "Mysteries of Manufacturing", there are four "Myths of Modeling" identified by Feltner and Weiner (1985) which should be avoided to preserve credibility with the manufacturing community. These myths are:

- 1) "This model considers all the important factors",
- 2) "Optimization is a Good Thing",
- 3) "A Good Modeler Can Model Anything", and
- 4) "Powerful modeling tools should not be put into the hands of the uninitiated".

3. CLOSURE

In summary, a key element of a successful modeling project is to establish credibility of both the modeler and model. Two areas for improving credibility that are the responsibility of the modeler are effective communication and learning the working environment. The suggestions addressing these areas offered in this presentation are not magic, but merely common sense and represent the experience of three modelers operating in a manufacturing environment.

REFERENCE

Feltner, C. E., and Weiner, S. A. (1985), Models, Myths and Mysteries in Manufacturing", Industrial Engineering, vol. 17, no. 7., page 66.

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