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ed. J. M. Charnes, D. J. Morrice, D. T. Brunner, and J. J. Swain

SIMULATION WORKS: A PANEL DISCUSSION

CHAIR

William R. Lilegdon
Pritsker Corporation
8910 Purdue Road, Suite 600
Indianapolis, Indiana 46268, U.S.A.

PANELISTS

Stuart Gittlitz
Kraft Foods
250 North Street
White Plains, N.Y. 10625,USA

Randy D. Moore
SONY Display Tube Company
16450 West Bernardo Drive
San Diego, California 92127

Patrick Reardon
Los Alamos National
Laboratories
Los Alamos, NM 87545

ABSTRACT

Simulation works. This panel will discuss the issues relating to successful simulation within their respective organizations. The panel will present successful simulation projects and the key issues that led to the success. Sample questions to be addressed by the panel include:

- How to introduce simulation to an organization?
- How to complete a project with a diverse project team? How to select or scope projects?
- How much technology is enough to solve a problem?

The diverse background of the participants will provide a broad view of what makes simulation work and how to repeat the process. Example projects will be discussed in addition to other issues.

1 INTRODUCTION

The use of simulation to support the decision making process within commercial organizations has been growing consistently for several years. New software technologies and more simulation education has led to an environment where simulation is easier, less expensive, and performed more often. The focus of many simulation conferences and discussions is often the technology applied to a given area. However, in practice, the technology often takes a back seat to other implementation issues. These issues include the introduction of the technology to the organization, the project approach, the dynamics of the project team, and many others.

These are issues that new and existing users need to examine. This panel will begin the discussion of these issues relying on the varied experience of the three active simulation practitioners.

2 SELECTING A SIMULATION STRATEGY

An organization must select an implementation strategy prior to implementation. This may or may not be a conscience selection. A continuum of options exists. At one end of the spectrum is the purchase of a simulation tool and the use of the tool by current facility staff. At the other end of the spectrum is the simulation consultant that is hired for point solutions. Both approaches have advantages and disadvantages. In between is a mix of the two approaches. Many larger organizations employ the consultative approach using in-house or corporate expertise. The panel has representatives from the entire spectrum.

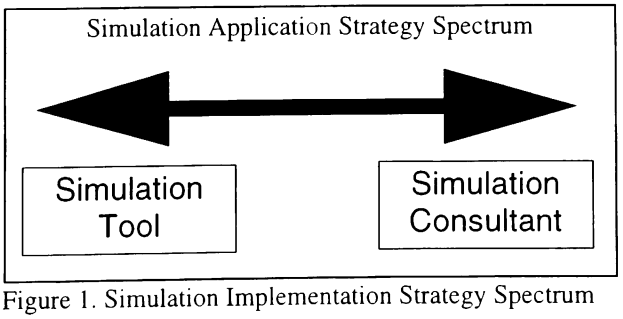

Figure 1. Simulation Implementation Strategy Spectrum

The simulation tool approach has the highest up-front costs, including the purchase of the software, hardware, training, and labor. But is also offers a high degree of flexibility and opportunity for application. Depending

on the volume of simulation projects, in the longer term analysis this approach could be more cost effective.

The consultive approach provides a quick solution. Getting the proper design for a new facility to be started in the next four weeks requires that this approach be used by an organization. Many simulation consultants can support multiple tools providing a broader range of skills that can be acquired in a short time by company staff. The premium expense for these consultants is often offset by the increased efficiency. From a strategic point of view, an organization must anticipate the volume of simulation work to be required before they chose a strategy. And most importantly they need to understand the continuum of services and the ability to move from a consultive approach towards more staff capabilities.

3 A SAMPLE PROJECT

Successful simulation, in this panel's viewpoint, means a positive result for the sponsoring organization. This result is usually measured in financial terms, although the successful simulations may also result in "soft" benefits. The "soft" benefits generated from a simulation project include better group communication and understanding of the processes being modeled. These benefits are also commonly associated with business re-engineering projects. Reduce operating expenses are the easiest to measure and communicate to organization management. However, one of simulations key benefits is often cost avoidance. In these projects a proposed design is evaluated. The design is refined to meet production targets with a lower investment. The avoidance of the expense is a cost savings but requires the publication of the less than favorable first design. Often these issues can not be communicated as widely within an organization and reduce the perceived benefit of simulation.

Other measures that impact the success of a simulation project include timeliness, cost, and team support. Project methodology can dramatically impact these measures. The following brief project description provides an overview of the typical simulation project.

Kraft utilizes simulation to design new facilities and improve existing ones. In this example, a Kraft plant was considering adding process capacity to a facility that processed and packaged a grain product. The existing operation steps included the processing of the grain, the in-process storage of the grain in one of 12 large bins, and the packaging of the finished product.

An engineering team was scoping the project to determine cost, timing, layout, etc. The simulation group was asked to help determine the right number of in-process storage bins to support the added production capacity. Additionally, less expensive methods to achieve the required production capacity, other than a major equipment installation, were to be considered.

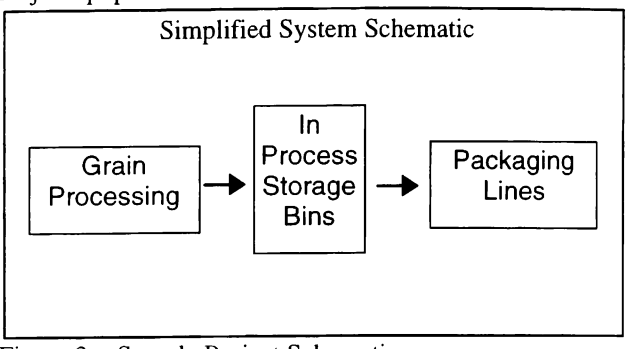

Figure 2. - Sample Project Schematic

To begin the modeling process the plant personnel were interviewed. From this information a simulation was developed showing the current process and packaging production for an entire week. The simulation showed that the existing grain process over-produced the packaging lines capacity. In fact, by mid-week of the simulation, the grain process was forced to shut down because all the in-process storage bins were full. When plant personnel reviewed the simulation results and animation, they said, "That's just what happens to us. When we run well, by mid-week, we have to shut down the process and let packaging catch up."

By checking the flow rates through the entire operation, it was discovered that a conveyor between the in-process storage bins and the packaging area limited the production capacity. While there were several packaging lines, the conveyor flow limited the amount of grain, so that only one or two packaging lines could be operated concurrently. When the amount of in-process grain was at high levels, additional packaging lines could not be supplied to help reduce the levels in storage. Eventually the grain production process had to be stopped. The original scope of the project was the addition of new process equipment to add capacity above what was already available.

After simulating several options for capacity increases, the final project added a larger transfer conveyor between in-process storage and the packaging lines. Added packaging line flexibility and higher transfer rates out of the in-process bins were proposed. The capital cost of this alternative was about 20 percent of the originally planned equipment addition.

Simulation worked to reduce the cost of a proposed design in this example. This project also describes the dynamic nature of the scope of some simulation projects. The original scope to determine the equipment needs in the grain production area was changed to evaluate the identified bottleneck occurring between the in-process

bin storage and the packaging lines. These re-directions of simulation projects are not uncommon and are very difficult to manage.

4 MAINTAINING SIMULATION SUCCESSES

In most organizations the use of simulation is sporadic. Budget and market cycles require that facilities be re-designed or developed on a less than continuous basis. To continue to provide an organization with the benefits of the simulation technology several issues need to be addressed.

First, the primary focus on every project should be the benefit to the user. Many projects allow focus to turn the advanced nature of the technological solution. These projects may be successful, but it is due more to luck than actions. The simulation process begins with the identification of the problem to be addressed. The benefits or key questions to be answered must be foremost in every phase of the simulation process.

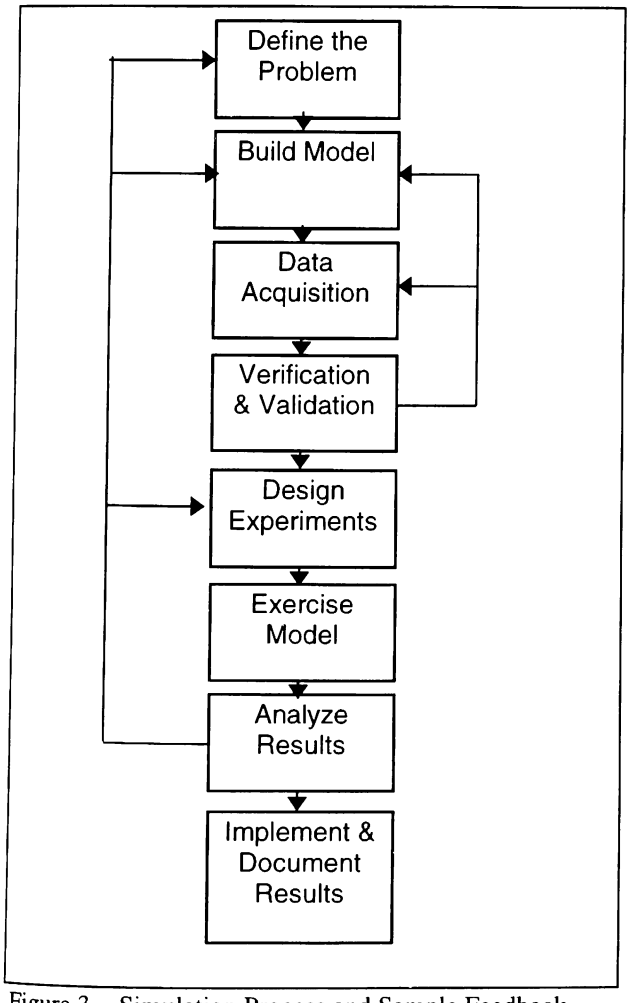

Figure 3. - Simulation Process and Sample Feedback

Focusing on this goal provides a measurable result with each project. These results are necessary to justify the investment in the next project.

Second, the accurate and timely documentation of results from previous projects is of the utmost importance. Many organizations have performed numerous successful simulation projects, but can point to few concrete advantages of the project twelve months after completion. This is caused not by the lack of contribution of the simulation technology but in large part by the dynamics of most organizations. In this twelve month period staffing and job assignment changes have erased or lost any corporate memory relative to the projects. To build an active simulation presence in an organization the demonstrated benefit of the technology must be documented and communicated.

Finally, simulation technology is changing rapidly. To contribute to an organization in the most effective manner requires an investment of time to stay abreast of the latest technology. A corollary to this idea is that as technology evolves and revolutionizes the application of simulation, the tools most familiar to the practitioner may become outdated. As the tools are developed for specific simulation applications it may also become necessary for practitioners to extend their "toolkit" to include other tools.

5 CONCLUSION

Simulation can work for many problems. The panelists will discuss how they make simulation work for their organizations. There will also be the opportunity for audience members to contribute and challenge the panelist's ideas.

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AUTHOR BIOGRAPHY

WILLIAM R. LILEGDON is a Vice President for Pritsker Corporation. He is responsible for the promotion, development direction, and delivery of Pritsker's engineering software and services. He

received a Bachelors Degree in Industrial Engineering from Purdue University. Since joining Pritsker Corporation he has worked in the consulting, development, support and training areas. William led the development of SLAM II/PC, SLAMSYSTEM, and FACTOR/AIM software products. He has published numerous papers and articles on simulation products and their application. William is currently the Vice Chair of Sim.TECH an association of simulation software vendors. He was General Chair of the 1995 Winter Simulation Conference.

STUART GITTLITZ is a Staff Industrial Engineer with Kraft Foods. He is responsible for the simulation of process and packaging lines throughout Kraft's manufacturing facilities. He teaches in-house simulation courses, hosts user meetings, and provides simulation consulting for new and existing production lines. Mr. Gittlitz earned a B.S. in Industrial Engineering from the Polytechnic Institute of New York. He is a member of the Institute of Industrial Engineers and the Society for Computer Simulation.

RANDY D. MOORE is Senior Industrial Engineer at SONY Display Tube Company. At SONY he is responsible for the design and coordination of major capital equipment projects for Sony's Trinitron picture tube manufacturing plant. Randy has twenty two years of manufacturing experience. He received a bachelor of science degree in business and management from the University of Redlands. Randy is currently enrolled full time in graduate studies in Strategic Management at United States International University.