

Project Management Case Study
The Custom Woodworking Company — Woody 2000 Project
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Introduction

I first developed this case study in 1993 for a local construction project management course. The incidents described are typical of the types of things that happen in real-life projects and I have seen most of them. Hopefully, they do not all happen on the same project, but the reality is that if project sponsors do not start out with an understanding of project management and its processes, the probability of such things happening are surprisingly high.

I have set out the story of the project according to its natural evolution. The commercial environment described was very typical of that existing here at that time. The problems are not difficult to spot, but can you see why they happened?

The case study is followed by a set of questions organized by project management knowledge area. You may use the case study and questions as you wish, subject to the copyright limitations.

Background

The Custom Woodworking Company is a small-to-medium sized custom furniture and cabinet making company, with head-office and a spacious plant site at Industrial Estates, Someplace, BC. Its Chairman and Chief Executive Officer is Ron Carpenter now in his late-sixties. His wife Mrs. Emelia Carpenter, being an aggressive business woman and somewhat younger than her husband, now effectively runs the company.

Ron Carpenter is affectionately known to all as "Woody" and so the company is generally known as "Woody's". Woody, after an apprenticeship as a cabinet maker, started his small furniture manufacturing business back in 1954 and he and his wife moved to their present location in 1959. The company quickly gained a reputation for attractively designed and well constructed furniture, using imported hardwoods and indigenous softwoods for its products. Woody's now produces custom furniture to order, several lines of furniture for wholesaler/retailers, and a number of variations of standard kitchen and bathroom cabinets, including units made to order.

Over the years the Carpenters continued to prosper and built up a loyal staff and work force. More recently their son, John Carpenter, has joined the company's management after having obtained a commerce degree at the local university. At John Carpenter's insistence, lured by longer production runs and higher and more consistent mark-ups, the company has moved into subcontract work supplying and installing counter-tops, cabinets and similar fixtures for new commercial construction. To date, Woody's has established a well-founded reputation for supplying millwork to the construction industry.

Woody's Corporate Profile

Head Office: Someplace, BC

Business: Furniture manufacturing, custom millwork, and hardwood importer; federal charter 1960; privately held; number of employees approx. 850. Major Shareholder: Emelia Holdings Ltd. At December 31, 199X, total assets were \$181,000,000. In fiscal 199X, sales were \$93,250,000 with net earnings of \$6,540,000.

Directors:

Chairman & CEO	Ron Carpenter
President	Mrs. Emelia Carpenter
Executive Vice President	Kim Qualey
Director	John Carpenter

Key Personnel:

VP Production	Miles Faster
VP Finance and Administration	Spencer Moneysworth
VP Personnel	Molly Bussell
VP Sales and Estimating	Bruce Sharpe
Controller	Kim Cashman

Other Key Players in this Case Study:

I. Leadbetter (Ian):	Woody's Project Manager.
R. Schemers (Randy):	Principal, Schemers and Plotters (S&P), industrial design consultants
A. Fowler (Alfred):	Director, Expert Industrial Developers (EID), industrial property developers and contractors
I. Kontrak (Ivar):	EID's Project Manager
D. Rivett (Dave):	I. Beam Construction Ltd., steel fabricators and installers
B. Leakey (Bert):	Classic Cladding Co., cladding and roofing contractors
C. Droppe (Charlie):	I. C. Rain Ltd., water-proofing contractors
A. Dent (Amos):	Tinknockers Associates, mechanical contractors
O. Volta (Olaf):	Zapp Electric Co., electrical contractors
E. Forgot (Eddie):	Piecemeal Corporation, equipment suppliers
W. Easley (Win):	Project management consultants

The Opportunity

In 1989 there was a mini-boom in commercial construction in south-western BC. With the possibility of a major airport expansion, and free-trade opportunities south of the border, Bruce Sharpe persuaded Woody's directors that they were well placed to expand their manufacturing business. Miles Faster, regularly complaining that the company's production efficiency was being thwarted by lack of manufacturing space, made a pitch to John Carpenter for moving to completely new and more modern facilities. John Carpenter, with a vision of growth based on computer controlled automation, talked over the idea with his father. Woody discussed it with his wife who in turn brought Kim Cashman and Spencer Moneysworth into the debate.

Cashman and Moneysworth felt strongly that they should remain where they were, since there was spare land on their property, even though not the most convenient for plant expansion. They argued that not only would this avoid the costs of buying and selling property, but more importantly avoid the interruption to production while relocating their existing equipment. Besides, the nearest potential location at an attractive price was at least fifteen miles further out from the residential area where most of them lived. Polarization of opinions rapidly became evident and so, in the spring of 1989, Woody called a meeting of the directors and key personnel to resolve the issue. After a visit to the factory floor and a prolonged and sometimes bitter argument lasting into the early hours, it was agreed that the company would stay put on its existing property.

The Project Concept

It was agreed at the meeting that additional production capacity would be added equivalent to 25% of the existing floor area. The opportunity would also be taken to install air-conditioning and a dust-free paint and finishing shop complete with additional compressor capacity. Equipment would include a semi-automatic woodworking production train, requiring the development and installation of software and hardware to run it. The President and Executive Vice Presidents' offices would also be renovated.

At the meeting, the total cost of the work, not including office renovation, was roughly estimated at \$17 million. Woody agreed to commit the company to a budget of \$17 million as an absolute maximum for *all* proposed work and the target date for production would be eighteen months from now. To give Woody's personnel a feeling of ownership, Molly Bussell proposed that the project should be called Woody 2000. Spencer Moneysworth would take responsibility for Project Woody 2000.

Planning

Moneysworth was keen to show his administrative abilities. He decided not to involve the production people as they were always too busy and, anyway, that would only delay progress. So, not one for wasting time (on planning) Moneysworth immediately invited Expert Industrial Developers (EID) to quote on the planned expansion. He reasoned that this contractor's prominence on the industrial estate and their knowledge of industrial work would result in a lower total project cost.

Meanwhile, Kim Cashman developed a monthly cash flow chart as follows. First he set aside one million for contingencies. Then he assumed that expenditure would be one million in each of the first and last months, with an intervening ten months at \$1.4 million. He carefully locked the chart away in his drawer for future reference. All actual costs associated with the project would be recorded as part of the company's normal book-keeping.

Upon Moneysworth's insistence, EID submitted a fixed-price quotation. It amounted to \$20 million and an eighteen month schedule. After Moneysworth recovered from the shock, he persuaded Woody's management that the price and schedule were excessive. (For their part, EID believed that Woody's would need considerable help with their project planning and allowed for a number of uncertainties). Further negotiations followed in which EID offered to undertake the work based on a fully reimbursable

contract.

Moneysworth started inquiries elsewhere but EID countered with an offer to do their own work on cost plus but solicit fixed price quotations for all sub-trade work. Under this arrangement EID would be paid an hourly rate covering direct wages or salaries, payroll burden, head-office overhead and profit. This rate would extend to all engineering, procurement, construction and commissioning for which EID would employ Schemers and Plotters (S&P) for the building and industrial design work. Moneysworth felt that the proposed hourly rate was reasonable and that the hours could be monitored effectively. He persuaded Woody's directors to proceed accordingly.

The Design

A couple of months later as S&P commenced their preliminary designs and raised questions and issues for decision, Moneysworth found he needed assistance to cope with the paper work. John Carpenter suggested he use Ian Leadbetter, a bright young mechanical engineer who had specialized in programming semi-automatic manufacturing machinery. Moneysworth realized that this knowledge would be an asset to the project and gave Leadbetter responsibility for running the project. Ian was keen to demonstrate his software skills to his friend John Carpenter. So, while he lacked project management training and experience (especially any understanding of "project life-cycle" and "control concepts") he readily accepted the responsibility.

During the initial phases of the mechanical design, Ian Leadbetter made good progress on developing the necessary production line control software program. However, early in design EID suggested that Woody's should take over the procurement of the production train directly, since they were more knowledgeable of their requirements. Miles Faster jumped at the opportunity to get involved and decided to change the production train specification to increase capacity. Because of this, the software program had to be mostly rewritten, severely limiting Leadbetter's time for managing the project. It also resulted in errors requiring increased debugging at startup.

Neither Moneysworth nor Leadbetter was conscious of the need for any review and approval procedures for specifications and shop drawings submitted directly by either S&P or by Eddie Forgot of Piecemeal Corporation, the suppliers of the production train. In one two-week period, during which both Faster and Leadbetter were on vacation, the manufacturing drawings for this critical long-lead equipment sat in a junior clerk's in-tray awaiting approval. For this reason alone, the delivery schedule slipped two weeks, contributing to a later construction schedule conflict in tying-in the new services.

Construction

Site clearing was tackled early on with little difficulty. However, as the main construction got into full swing some eight months later, more significant problems began to appear. The change in production train specification made it necessary to add another five feet to the length of the new building. This was only discovered when holding-down bolts for the new train were laid out on site, long after the perimeter foundations had been poured. The catalogue descriptions and specifications for other equipment selected were similarly not received and reviewed until after the foundations had been poured.

Leadbetter was not entirely satisfied with the installation of the mechanical equipment for the dust-free paint shop. As a registered mechanical engineer, he knew that the specifications governed the quality of equipment, workmanship and performance. However, since these documents had still not been formally approved, he was loath to discuss the matter with Ivar Kontrak. Instead, he dealt directly with Amos Dent of Tinknockers Associates, the mechanical sub-contractor. This led to strained relations on the site.

Another difficulty arose with the paint shop because the local inspection authority insisted that the surplus paint disposal arrangements be upgraded to meet the latest environmental standards.

Startup

Two years after the project was first launched, the time to get the plant into production rapidly approached. However, neither Moneysworth nor Leadbetter had prepared any meaningful planning for completion such as owner's inspection and acceptance of the building, or testing, dry-running and production start-up of the production train. They also failed to insist that EID obtain the building occupation certificate. Moreover, due to late delivery of the production train, the "tie-in" of power and other utility connections scheduled for the annual two-week maintenance shut-down could not in fact take place until two weeks later.

These factors together resulted in a loss of several weeks of production. Customer delivery dates were missed and some general contractors cancelled their contracts and placed their orders for millwork elsewhere. Finished goods inventories were depleted to the point that other sales opportunities were also lost in the special products areas on which Woody's reputation was based.

Control

Costs arising from these and other changes, including the costs of delays in completion, were charged to Woody's account. Project overrun finally became reality when actual expenditures exceeded the budget and it was apparent to everyone that the project was at best only 85% complete. Cashman was forced to scramble for an additional line of credit in project financing at prime plus 2-1/2%, an excessive premium given Woody's credit rating. From then on, Woody's were in a fire fighting mode and their ability to control the project diminished rapidly. They found themselves throwing money at every problem in an effort to get the plant operational.

During Woody's period of plant upgrading, construction activity in the region fell dramatically with general demand for Woody's products falling similarly. Even though Sharpe launched an expensive marketing effort to try to regain customer loyalty, it had only a marginal effect.

Post Project Appraisal

The net result was that when the new equipment eventually did come on stream, it was seriously under utilized. Production morale ebbed. Some staff publicly voiced their view that the over-supply of commercial space could have been foreseen even before the project started, especially the oversupply of

retail and hotel space, the prime source of Woody's contracts. John Carpenter, not a favorite with the older staff, was blamed for introducing these "new fangled and unnecessarily complicated ideas".

Because of this experience, Woody's President Emelia Carpenter retained project management consultant Win Easley of W. Easley Associates to conduct a post project appraisal. Easley had some difficulty in extracting solid information because relevant data was scattered amongst various staff, who were not keen to reveal their short-comings. Only a few formal notes of early project meetings could be traced. Most of the communication was on hand-written Speedy memos, many of which were undated. However, interviews with the key players elicited considerable information, as has been outlined above.

Case Study Exercise

The incidents described in this case study are typical of the types of things that happen in real-life projects. They are a reflection of peoples' attitudes and the way they do things. Perhaps they do not all happen on the same project. Yet the reality is that if project sponsors do not start out with an understanding of project management and its processes, the probability of these kinds of happenings are quite high! One of the best ways of learning is from mistakes — preferably from those of other people.

The focus of this case study centers on construction. However, the project has served to bring to light many of Woody's management short-comings and the need for change. Can you spot the real source of the problems and what needs to be done to fix them?

Your task is to show how you would run this project properly from the beginning.

Project Appraisal Questionnaire

The purpose of project management is to achieve a successful project and all that this implies. So, if you were Win Easley, the project management consultant, what would you report? Specific issues for your consideration follow. You will not find all the answers written into the case study. Some of the answers are matters of opinion and you will need to search my site for ways to approach many of them.

1. Project Concept and Strategy

- a. Was the Woody 2000 project well conceived? Give reasons for your opinion.
- b. What were Woody's real objectives that could and should have been articulated?
- c. What strategies were there for achieving these objectives? What would you recommend?
- d. Did they consider other solutions? Give Examples.
- e. How would you gauge the project's success, Could success be measured? If so, when?

2. Project Scope

- a. Why do you suppose renovation of the President and Executive Vice President's offices were included in the project and was that a good idea?
- b. Write a simple project scope statement
- c. Develop a work breakdown structure.

3. Project Planning

- a. What should be included in a Woody 2000 project plan? What use would it be?
- b. Evaluate Woody's plans for managing the project, including their approach to contracting for professional services and construction work. What would you have done and would that change for successive phases of the project?
- c. Did the project plan explain how the project and any changes would be controlled? Should this be part of the plan? Give reasons.

4. Quality

- a. How should quality be approached, and what does it mean?
- b. Why did Leadbetter not invoke the specifications to ensure quality? What was the result?
- c. What is the importance of Quality to a project like this?

5. Planning and Scheduling

- a. Identify and describe a set of project schedule milestones from project concept to project completion.
- b. Illustrate your milestones on a simple bar chart scaled to the information provided in the Case Study.
- c. Would a good baseline plan have helped to show that the project would not meet its schedule? If so, how?
- d. How should float on the critical path have been managed? Would this have helped to complete on time?

6. Cost Estimating

- a. Develop a high-level estimate by "guesstimation".
- b. How should the estimate be presented?
- c. Is life-cycle costing a factor on this project?
- d. Cashman kept his cash flow chart a secret. Why, and what would you have done?

7. Contracting for Engineering and Construction Services

- a. What were the contracting alternatives open to Woody's? Which would have been best and what would that have involved?
- b. How should the contract(s) be organized and tendered?
- c. How should they be administered?
- d. Were the original Woody 2000 project requirements delivered?

8. Communication and People Management

- a. Draw a project organization chart. What were the real relationships?
- b. Should Leadbetter have been left to run the project? Would training have helped?
- c. How should the Woody 2000 project plan be communicated and when?
- d. What communication (coordination) would you expect to see during execution?

9. Progress Monitoring and Control

- a. Would a good baseline plan have helped to make up time?
- b. Draw a responsibility chart for effective control.
- c. What would you have done when you saw that the project would not meet its schedule?
- d. Project records were apparently poor. What records should have been kept and how?

10. Cost Control

- a. Why was EID's first price so high? Was their position reasonable?
- b. When did Woody's know they were in trouble with over expenditure? What was the result?
- c. How should the project budget and expenditures be set out for cost control?
- d. Draw a simple flow chart for processing changes?

11. Risk Identification and Management

- a. How did EID handle their risks? Was this effective? What might they have done?
- b. List Woody's actual surprises and add other possible surprises. What was, or should have been, done to prepare for and respond to them?
- c. Were there changes? What were the impacts?

12. Facility Startup and Project Closeout

- a. How was startup managed on the Woody project? How should it have been managed?
- b. The Woody 2000 project was evidently not well run. Why? Give reasons for your opinion.
- c. Develop a list of "Key Success Indicators" that could and should have been measured on completion. Rank them in order of priority for this project.