12.4 Progress Reports

After you or your firm has landed a project through the proposal, you use progress reports to keep the client apprised of the status of the project.

12.4.1 Purpose and Frequency

A **progress report** describes the status of a project: what has been accomplished, what's going on right now, and what work is still ahead. It also describes any problems, any changes, or anything unexpected relating to the project. And it sums up the overall status of the project.

Progress reports are an expected part of all large, lengthy, expensive projects. They may be required by the contract for the project, and in any case they are a standard part of good business practice and professionalism. After all, if your client or your management is spending millions of dollars on a multiyear project, they want to know how it's going. Progress reports can be weekly, monthly, quarterly, yearly—whatever the situation, the contract, or the standard practice requires.

Work Completed

The following is a summary of the efforts during this reporting period:

1. We completed the two short-term projects for manufacturing and delivering carbon fiber roving to meet the immediate needs of the Automotive Composites Consortium development programs.
2. We developed and provided partially oxidized polyacrylnitrile (PAN) fiber to Oak Ridge National Laboratory (ORNL) to support the microwave research efforts at ORNL.
3. We requested and we were granted a no-cost extension by ORNL.
4. We completed and submitted the mid-year and quarterly reports as requested by ORNL.
5. We completed and submitted the current project final report to ORNL in September 2004.

Future Work

Research-scale trials and preliminary cost-model estimates have led to three viable routes for the development of continuous-tow low-cost carbon fibers with mechanical properties meeting low-cost carbon fiber targets:

- *Chemical modification of textile acrylic fibers.* Uncollapsed textile acrylic fiber gels will be exposed to an aqueous NaOH solution during the spinning process to induce functional group hydrolysis and hence speed up the stabilization process.
- *Radiation pretreatment of textile acrylic fibers.* This task will involve exposing textile acrylic fibers to an E-beam radiation dose of 30 Mrad prior to oxidation to induce stabilizing cyclization reactions.
- *Sulfonation of polyethylene fibers.* Commercial polyethylene fibers will be passed through a bath of hot concentrated sulfuric acid in order to induce cross-linking reactions that render the fibers infusible and carbonizable.

These three development routes will be the focus of our work in the next reporting period.

Figure 12.26 *Progress-report example using the time-periods approach.*

Scale-up and Verification of Chemical Modification Technology
Objectives in this task include demonstrating and verifying production technologies for producing the textile fiber with chemical modification and conversion into carbon fibers.

Modification of Textile Acrylic Line. This subtask consists of modifying the textile line to implement and incorporate the application of chemical modification in-line. Within the scope of this task, the engineering design requirement for installation will be developed and modification equipment will be integrated in the line before verification and scale-up trial run are performed.

Verification of Scaled-up Chemical Modification Process. Once the modification of the textile line is completed and equipment is debugged to ensure operational performances, the next step will be to verify scale-up of the chemical modification processing on the large textile fiber. Several trials will be performed to verify processing conditions, to develop manufacturing procedures, and to manufacture materials for conversion into carbon fiber at our facilities.

Figure 12.27 *Progress-report example using the tasks approach.*

12.4.2 Organizational Approaches

Progress reports typically use a time or task approach or some combination of the two. In the **time approach**, you describe what you have accomplished to date, what work is going on currently, and what work is still ahead. In the **task approach**, you describe each task in terms of what you have completed, what is the current focus, and what lies ahead. Obviously, these two approaches are mirror images of each other

12.4.3 Standard Contents

Apart from the essential work of summarizing work accomplished, current work, and planned work, progress reports should describe the project. After all, the progress report might be circulated to individuals in the client organization who are unfamiliar with the project.

Requirements for progress reports may include financial data, such as costs for the reporting period. Most progress reports conclude with an overall evaluation of the project.

An interesting example of a large-scale progress report entitled *Progress Report on the Federal Building and Fire Safety Investigation of the World Trade*

Project Overview

In October 1999, the U.S. Department of Energy's Office of Transportation Technologies (DOE-OTT), through the Oak Ridge National Lab (ORNL), awarded this corporation a multiyear contract to define and develop technologies needed for the commercialization of low-cost carbon fibers (LCCFs) to be used in automotive applications. Lighter-weight automotive composites made with carbon fibers can improve the fuel efficiency of vehicles and reduce pollution. However, for carbon fibers to compete more effectively with other materials in future vehicles, their cost must be reduced. Therefore, this project targets the production of carbon fibers with

adequate mechanical properties, in sufficiently large quantities, at a sustainable and competitive cost of $3 to $5/lb.

Project Deliverables

At the end of this multiyear project, technologies for LCCF production will be defined. This definition will specify required materials and facilities and will be supported by detailed manufacturing cost analyses and processing cost models. To achieve this definition, laboratory trials and pilot-scale demonstrations will be performed.

Planned Approach

Initially, this project was divided into two phases:

Phase I: Critical review of existing and emerging technologies, divided into two tasks:

- Literature review and market analysis, which led to further refinement and down-selection of the most promising technologies.
- Laboratory-scale trials and preliminary LCCF manufacturing cost assessments of the proposed technologies.

Phase II: Evaluation of selected technologies using pilot-scale equipment and cost models. Phase II was divided into three tasks:

- Pilot-scale design for the evaluation of selected LCCF technologies. This included modifications of a polyacry-lonitrile (PAN) spinning pilot line and two different carbon fiber conversion lines (a single-tow research line and a multi-tow pilot line) and the construction of continuous sulfonation processing equipment.
- Experimental evaluation of down-selected LCCF technologies, including commodity textile-tow PAN (with chemical modification and radiation and/or nitrogen pre-treatment) and poly-olefins linear low-density polyethylene [(LLDPE) and polypropylene (PP)].
- Large-scale feasibility studies of selected LCCF technologies.

Figure 12.28 *Progress-report excerpt providing an overview of the project.* (Excerpts adapted by permission from Hexcel Corporation's progress report to Oak Ridge National Laboratory on a project to define technologies needed to produce a low-cost carbon fiber (LCCF) for automotive applications.)

Overall Project Evaluation

To date, this project has demonstrated the technical viability of the textile acrylic fiber-based technologies through pilot-scale experiments. Through engineering feasibility studies, we have successfully defined the manufacturing facility and processing costs needed to make 1,820 MT/year (4×10^6 lb/year) of LCCF in two carbon fiber production lines.

Our detailed economic analyses have indicated that the carbon fiber manufacturing cost can be reduced from ~$13.20/kg (~$6.00/lb) for large tow textile PAN to ~$9.9/kg (~$4.50/lb) with either chemical or radiation pretreatments. These mill cost estimates are based on standard carbon fiber manufacturing model parameters and exclude any return on investment (ROI). If you require the inclusion of ROI, we will need to research additional processing improvements in order to reach the LCCF cost targets in an economically sustainable manner.

Figure 12.29 *Progress-report example providing an overall evaluation of the project.*