Capital projects: Part II


Kevin McGuinness


Stephen Bauld

"Capital projects: Part I" (*Summit*, October 2004) pointed out that problems with major capital projects (MCPs) generally fall into three categories: the practices followed when commissioning the project; technical factors; and time, staff and budget being under resourced.

Often staff is assigned project responsibilities in addition to their existing workload, which can lead to conflicts arising between their duties. Some method must be developed to address those conflicts that both ensures that the project does not suffer from under-staffing and that the best use is made of existing expertise.

Allocating manpower is only one step. The project implementation plan must provide for a systematic approach towards time, resource and cost management. Planning is a difficult, creative activity that entails juggling many variables until the circumstances of the organization, the objectives of the project, along with the resources and actions required to carry out the project, are brought into some sort of equilibrium.

To ensure that all crucial elements of the project are delivered and that cost constraints are met, budgetary concerns and control should be coordinated with control over technical requirements and functionality. Budgeting and design should be carried out in tandem.

In any organization, there are likely strong advocates in favor of a capital project. To secure support, they tend to overstate the magnitude of the problem and the ability of the project to deliver an improved level of service, while at the same time they understate the costs. When costs escalate beyond what was originally expected, often the tendency is to adopt a "rob-Peter-to-pay-Paul" approach to project funding. Resources are diverted from one area to shore up another. Reducing the resource commitment to project management can seem like a quick solution – since the management of a project *per se* has no direct bearing on the functionality of the finished project – but failure to provide for proper management can lead to improperly supervised work. While it is a natural desire to control cost, unfortunately, with MCPs, often too little consideration is given to the impact of cost-cutting measures.

The "rob-Peter" syndrome can set in at a relatively early stage in execution or even design of the project, as the excessive optimism of original cost estimates becomes clear. Therefore, the nature and scope of the problem, the benefit of solving it and the basis of cost projections, as well as the sensitivity of cost projections to delay and other hazards, need to be critically assessed before any decision is made to go ahead. Only following that vetting, should the required financing be committed.

Change management is another area of concern, as project specifications often evolve as work progresses. Some method of controlling changes to design that ensures that each change introduced to the project is appropriately defined, evaluated and approved prior to implementation – and also that funds are available to pay for it. Change almost always increases cost. There are three key aspects to proper change management:

- A submission process for change requests;
- A review method for such requests, including a feasibility analysis incorporating an assessment of technical capability, delivery cost, total cost and compares cost to benefit; and
- A formal approval process that includes communicating to the contractor authority to implement the same.

One of the best ways – and the simplest – of both controlling costs and increasing timely delivery is to keep changes to a minimum. Unfortunately, when resources are cut back, all too often the result is to open the project to ill-considered changes. Reducing expenditure on management may actually force costs higher in the long run, and result in the delivery of a final product that either fails to satisfy the original design/performance requirements, or that presents an unacceptable degree of risk in meeting those requirements.

Another area often under resourced is time – and particularly when a project involves the development of new technology. These projects, which as experience teaches are almost never brought in on time, should not be initiated without ensuring that adequate and timely resources are available to achieve the goal. Project timescales should be designed with robust margins to cope with the inherent uncertainties of innovation.

Research and other technology related costs escalate in line with any increase in the time required for development. As early as possible, comprehensive project documentation should be developed that covers all aspects of the technical requirements and provides sufficient design description and justification to permit the margins and risks to be assessed and provided for. Proper risk management requires specific responsibility to be assigned to deal with each aspect of identified risk. If a catastrophic situation developed, the project management plan should provide for recovery and have a back-up plan. The more speculative or innovative a project is, the greater the risk of exposure to high-level shock (e.g. a failure to develop a component technology within the expected time frame).

Developing a suitable method for testing the reality of the many assumptions made during the design and carrying out of the project – backed up by interim testing arrangements where feasible – is critical to success. If actual testing is not possible, designs should be subject to a stringent system of check and independent crosscheck.

Steve Bauld is purchasing manager at the City of Hamilton, and Kevin McGuinness is a lawyer with Ontario's Attorney General.