

## Total Process Costing:

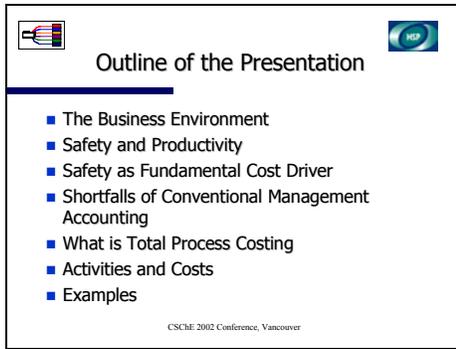
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# a strategic tool in safety management

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CSChE 2002 Conference, Vancouver

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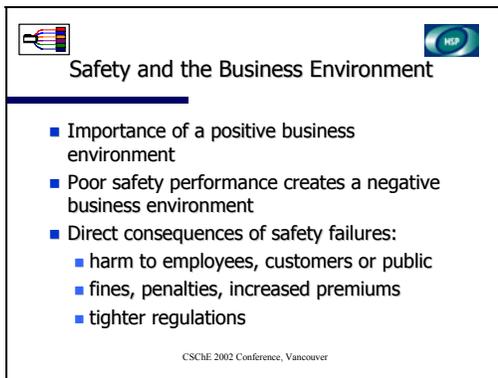
**Outline of the Presentation**

- The Business Environment
- Safety and Productivity
- Safety as Fundamental Cost Driver
- Shortfalls of Conventional Management Accounting
- What is Total Process Costing
- Activities and Costs
- Examples

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I will first set the context of my presentation by talking about the business environment and how it is affected by safety performance. I will then link safety and productivity and set safety as a fundamental, strategic cost driver. I will talk about the shortfalls of standard management accounting and explain how Total Process Costing is different and how it will provide essential information for decision making. Through two examples I will show you Total Process Costing in action, using a model that I have developed with the collaboration of a colleague, John Lewko, and two MBA students, Jane Djivré and Tiina Koppinen.

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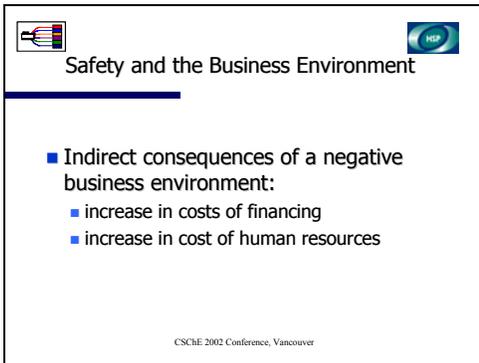
**Safety and the Business Environment**

- Importance of a positive business environment
- Poor safety performance creates a negative business environment
- Direct consequences of safety failures:
  - harm to employees, customers or public
  - fines, penalties, increased premiums
  - tighter regulations

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Everybody will agree that a positive business environment is essential for the success of any firm. An organization maintains a favourable business environment by harmonizing the needs of many stakeholders, including shareholders, financiers, customers, employees, regulators and the public at large; also by balancing present and future needs. The business environment is particularly vulnerable to the perceived inadequacy of a firm's response to public concerns, especially safety. For example there is the case of the Korean airlines which were denied landing rights in North America following unsafe events; or the case of tire failures at Ford and Bridgestone; Westray and Swiss Air went out of business after their terrible accidents. Safety failures cause harm to employees, customers or the public. They cause financial damage such as fines, settlements, criminal penalties and higher insurance premiums, or provoke tighter regulations. However, prohibitions, fines and regulations are neither effective nor efficient. Expenditures resulting from such consequences are not productive; in contrast, strategies and policies that raise awareness of these harms and promote their prevention are good business practices.

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**Safety and the Business Environment**

- Indirect consequences of a negative business environment:
  - increase in costs of financing
  - increase in cost of human resources

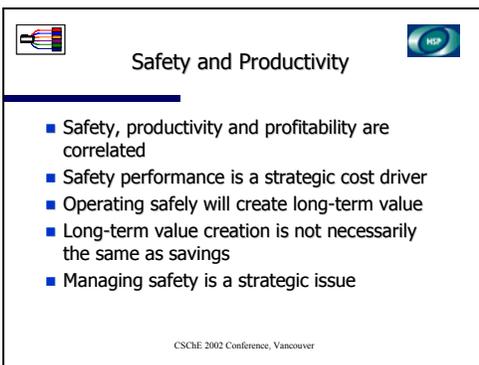
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A negative business environment affects the ability of a firm to create value in hidden ways:

**Costs of financing:** a firm that creates a negative business environment is likely to face unfavourable share value and riskier financial conditions. Because of the increased risks, costs of financing in the equity or borrowing markets are likely to be higher than those of competitors facing a positive business environment.

**Cost of human resources:** An unsafe company would also be less likely than its more successful competitors to recruit and retain competent and committed employees. Employee commitment reflects management commitment and expectations. Employees internalize the low expectations of an unsafe firm, with a corresponding impact on productivity, efficiency and ultimately revenues and profit.

In a study of employee turnover in manufacturing in Cornwall, Ontario, employees identified safety concerns as important in their decision to look for another job. The cost of replacing an employee is evaluated as equivalent to one year wages (Wilson and Wilson, 2002).



**Safety and Productivity**

- Safety, productivity and profitability are correlated
- Safety performance is a strategic cost driver
- Operating safely will create long-term value
- Long-term value creation is not necessarily the same as savings
- Managing safety is a strategic issue

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Experts such as Professor Hudson in the Netherlands said “there is strong evidence that those companies that are most safety minded are also among the most profitable”. Weyerhaeuser agrees with this. The Vice President responsible for safety states: Why should our shareholders care about safety performance? Because statistically good safety performance correlates closely with other performance indicators such as productivity and quality that bear directly on profitability”. “Good safety performance correlates directly with increased productivity and quality”.

In a strategic sense, an organization competitive position is shaped by the structural choices it makes and by its executional skills. Plant layout efficiency, capacity utilization, environmental performance, and safety performance are viewed as fundamental cost drivers. A firm can gain a sustainable competitive advantage by controlling these drivers better than competitors.

The benefits of good performance are long term value creation. Here the distinction is between short term savings that do not usually create value and long term savings that do. Management can make strategic choices that will lead to long term savings that create value for the organization; and that can be at the expense of increased short term costs.

A focus on safety is a strategic choice.

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Why a New Way of Costing of Incidents?



- Existing costing methods are imprecise
- Importance of information on strategic cost driver to improve performance
- Need for realistic, credible and complete information for sound management decision making

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Existing costing methods give only crude estimates of the real cost of incidents, perhaps many times below the real value. Estimates are not useful management information on which to make decisions, and they may do more harm than good if they are far from the true cost.

As a fundamental cost driver, safety performance contributes to the competitive positioning of the firm. It is essential that management have realistic credible and complete information. The cost has to be a figure based on facts, representing the experience of the company. Cost information reinforces the thinking needed to design improvement programs and to make them work.

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In conventional management accounting cost is primarily a function of only one cost driver: output volume. In a value added framework, output volume captures little of the richness of cost behaviour. There are multiple drivers which differ across value activities.

Conventional management accounting tends to highlight cost components within each department without providing the overall context to frame the firm strategic options. Each department or unit operates within their own budget, production and time constraints, with their own incentives, and usually with a short term focus.



Shortfalls of Conventional Management Accounting



- Volume as the main cost driver
- Focus on Individual Units
- Allocations
- Distortions
  - Operating Incentives
  - External Insurance
  - Self-insurance

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In addition, conventional management accounting calls for all kinds of allocations, thus masking the relationship between tasks and costs. We calculate unit costs which we then use to make erroneous decisions.

I have three examples of common management accounting practices that can have a dangerous impact on safety performance: *operating incentives*: middle managers often work under local or worksites incentives aimed at making short-term savings. These short-term savings can be in direct conflict with longer term diffuse benefits of strategic decisions. A manager may choose not to increase the unit short term costs even if the result was longer term common organization benefits, if the increase would result in a personal loss.

***Self-insurance***: along with conventional insurance, self insurance can help entrench excess capacity. When future budgets are projected from recent ones, they already include the recent spate of incidents, waste and related inefficiencies. Managers using what-is as the baseline, rather than what-could-be or what-ought-to have been, argue for the status-quo of maintaining the known level of injury and inefficiency. They get support from the cost system, which flags prevention expenditures as an explainable negative variance but which ignores the built-in costs of injury, inefficiency and insurance. If the public is directly affected, maintaining the status-quo beyond reasonable limits can lead to much greater losses. The recent example of British Rail comes to mind

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**Shortfalls of Conventional Management Accounting**

- Captured costs can be visible
- Captured costs can be hidden
- Uncaptured and unmeasured costs

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**Conventional management accounting does not support a safety management strategy in other ways: Visible costs, such as the cost of running the health and safety department, are easily captured by the accounting systems.**

**Other costs, such as the salaries paid to employees inactive because of a safety failure, are captured, but they are hidden, imbedded in other accounts and not attributed to the failure.**

**There are also unmeasured and uncaptured costs of failures, such as the loss in production or the lower employee productivity, or the various costs to society, which are nevertheless real.**

**What is needed is quantifying the effect of the safety management cost driver. Internalizing the full cost, including externalities, encourages restoring quality and setting up preventative measures.**

**Total Process Costing**

- TPC measures the full costs of everything people do (or do not do) as a result of a failure/incident.
- No distinction between
  - direct and indirect costs
  - variable or fixed costs
- All costs are included

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**Total costing is not a new concept. It has been discussed for example in the context of procurement and of ownership. The total cost of procurement allows a firm to make better informed decisions re supplier choices and design; The total cost of ownership incorporates not only the acquisition cost of a resource but also all the costs associated with integrating it with other needs, using and replacing it later on.**

**Total Process Costing is an extension of these approaches. It is aimed at developing an understanding of the “true cost” directly related to incidents and accidents. The costs of everything that people do as a result of the incident should be included without a distinction between direct or indirect, fixed or variable. For examples, the costs of the investigation by employees and outside experts, the cost of replacing injured workers, the costs of meetings, including time spent by higher management, the cost of the production lost, the cost of corrective actions, etc...For a complete picture, depending on the use of the information, we could include not only the costs to the organization but also the costs to society. Think about Ford for a minute.**

**Approach Behind TPC**

- Principles of activity based management / accounting
- Systematic gathering of activity data
- Systematic classification of data for analysis

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**Total Process Costing uses the principles of activity based management or accounting based on causality. The main objectives of activity based management are to perform activities more efficiently and to eliminate activities that do not create or add value, to streamline the value added activities and thus to improve productivity.**

**TPC was developed explicitly to promote increased efficiency through safety management. It calls for a systematic gathering of data on all the activities that resulted from the incident under investigation, defining causes and linkages.**

**The data is classified according to the types of activities and can be aggregated, summarized and broken down in different ways according to the intended use of the information and consequently the needed analysis.**

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### Why Focus on Activities?

- Activities
  - are mechanisms by which all organizational resources are used to accomplish work
  - create costs
  - can be managed if data is available

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**Activities are the central focus of every organization. The results of people using equipment, material and services to carry out these activities are products and services delivered to customers and costs to the organization.**

**Activities and consequently costs can be managed, increasing their value adding, eliminating the non value adding ones, for improvement in processes and ultimately in profitability**

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### Reasons for Using TPC

- Quantifies the full effect of safety failures / incidents
- Proactive approach to safety management
- Breaks the "silos" and promotes cooperation
- Results in
  - streamlining of operations and maximization of efficiency and
  - learning

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**In addition to obvious activities following an incident, TPC asks: what are all the other activities which are attributed to the incident? It clarifies the parallels between incidents and inefficiencies. Organizations calculating the total cost of procurement, for example, report gaining a different awareness of the significance of costs.**

**TPC will help identify costs that are symptoms of problem areas. TPC supports a proactive approach to safety management. Data analysis of one or more incidents should lead to preventative measures, thus improving safety performance and efficiency. Because of its broad perspective, TPC promotes cross-functional team work that bring the organization to learn from its own experiences and internal debates.**

**In the examples I will show you, the visual display of activities and costs with details, summaries and breakdowns have sparked lively team meetings. Supervisors and employees around the tables were asking probing questions concerning both the incidents and the follow-up actions. They were learning from the incident and internalizing the lesson.**

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### Short-Term Benefits

- Encourage scrutiny
- Focus organization on strategic cost driver
- Provide information for long-term investment analysis
- Move organization toward sustainable sources of value

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**Total costing of safety failures will encourage managers and employees to ask why. People focus on what is being measured and spend less time on what is not being measured. They will look at cause and effects and they will be able to identify waste. Management will realize that it is less expensive to increase profit by cutting accidental losses and avoiding the resulting waste than by investing in productive capacity to increase market share. Their incentive will be in injury prevention.**

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### Long-Term Benefits

- Fewer injuries and incidents
- Long-term value creation
- Competitive advantage
- Better business environment
- Better understanding of firm strategic options

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**And with fewer injuries and incidents there will be other long term benefits. The organization will gain competitive advantage by better controlling the safety cost driver and the better business environment will translate in lower costs and a virtuous cycle.**

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### Barriers to TPC Implementation

- Defining and obtaining information
- Obtaining valid and unbiased responses
- Obtaining timely responses
- Interruptions from other business priorities
- Maintaining a high level of cooperation and interest in applying results throughout organization

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**Changing the way to do things or adding new ways is not always easy. The major resource problem is lack of computer systems and information to support the TPC effort. The person compiling the information cannot get the data from the firm's current systems. Information has to be gathered across departments with sometimes reluctant cooperation. To maintain a high level of cooperation and interest in applying results throughout the organization, the fit between short or local and long or strategic interests has to be clear and accepted. Upper management must convey its vision of safety as a strategic issue.**

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### A Model for TPC: PIECES™

- An Excel-based computer application to measure the total cost of safety failures
  - It provides a visual display of activities
  - It links activities and their Excel costing files
  - It provides summaries and breakdowns of costs
  - It is designed to encourage analysis, discussion and learning

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**The Total Process Costing model is grounded in real work practices: it is based on a review of many incidents and accidents that occurred in several firms to identify and classify activities. The resulting preliminary model was discussed at length with health and safety supervisors and plant managers and modified as suggested. It has been applied in a variety of organizations. Below is a brief overview of the model applied to an incident in a processing plant.**

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