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Showing EHS Value Through Return On Investment (ROI)

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Introduction

Business pressures have caused Environmental Health and Safety (EHS) programs and resources to be at risk in this soft economy – the economy's global competition, shrinking markets, consumer and capital spending reductions, raw material cost increases, and pricing pressure; making business survival that much more challenging. In December 2010, the United States Bureau of Labor Statistics reported an unemployment rate of 9.4%, since our current recession started around January, 2008[1]. Texas, the South, much of the Mid-West and East Coast have rates at 8% or higher.[2] Some states such as California, Nevada and Florida, have unemployment rates at 12% or higher.[3]

The market economy has forced companies to reduce costs by closures, consolidation and restructuring. It is been all too common these days to read newspaper headlines about a company closing, relocating or downsizing. According to the California Department of Finance's December 2010 Bulletin, the state's unemployment rate held steady at 12.4 percent.[4] Since the national recession began, California has lost 1.3 million jobs, with job gains to date this year 47,900, only a fraction of the total job loss.[5] Alternating job gains and losses from month to month are indicative of a "slow and uneven economic recovery."[6]

Given these economic indicators, EHS programs and resources can be at risk in this soft economy. EHS professionals are typically viewed as overhead costs and not part of a revenue generating operation. Critical headcount and positions may be eliminated. Some enterprises are willing to take more risks that previously considered. Some business managers might scale back

[1] US Department of Labor, Bureau of Labor Statistics, " News Release – Regional and State Employment and Unemployment – December 2010" (Washington, D.C.: January 25, 2011, USDL-11-0083), p. 1-6.
[2] ibid., p. 1-6.
[3] ibid., p. 1-6.
[4] California Department of Finance, "Finance Bulletin – December 2010" (Sacramento, CA: December 2010), p. 1.
[5] ibid., p. 1.
[6] ibid., p. 1.

EHS programs and goals while resizing their EHS organization structure and staffing. Remaining employees are expected to leverage existing resources and asked to do more with less, a familiar theme. Finally, funding for capital can be tight, reduced or delayed, making it harder to launch key EHS initiatives.

Financial measurement for EHS is not a common practice. Historically, EHS professionals have not quantified their financial value to an organization. This is due to several reasons; including the lack of financial modeling tools or limited understanding as to their use, and EHS costs being bundled with general overhead administrative expenses. EHS can be viewed as a cost of doing business with the longer financial payback periods necessary for many EHS project approvals make justification challenging. Finally, EHS value (risk related cost savings) is difficult to quantify in financial terms.

EHS professionals can demonstrate contributions to a business by communicating financial value. EHS professionals can show value to an organization by; quantifying savings to an organization, measuring risk reduction savings in financial terms, quantify productivity impacts, justifying headcount with program savings, performing a cost benefit analysis, and calculating return on investment for various EHS initiatives. This presentation will focus on calculating the ROI and other financial analytical methods.

Financial Analysis

Why Calculate a Return On Investment (ROI)?

So why would we want to calculate a return on investment for EHS programs and projects? First, it speaks our business language. Secondly, it illustrates a measure of profitability (or loss) for the organization. Third, it provides a consistent accounting method. Financial analysis can help justify EHS expenditures. Finally and most importantly, this process can help validate proactive programs that actually reduce risk and provide a payback on its investment. If we fail to sell our proactive programs, we may be limited to compliance oriented EHS programs viewed as "overhead" costs by the organization. According to the OSHA Office of Regulatory Analysis, when a 20% reduction in injury and illnesses is achieved, a return of $4-$6 for every dollar invested can be realized.[7]

When communicating to your finance manager or chief financial officer regarding a proposed EHS project, how effective is the statement "Please approve my budget with $150K in spending for slip trip & fall injury improvements?" Most would answer, not that effective. Once you perform a financial analysis and have determined the return on investment, reframe the previous question. "My budget includes a $150K investment in slip, trip and fall risk reduction projects that can provide $450K in savings over a 3 year period," a much more effective statement and the project is more likely to get funded. This approach changes the common EHS terminology misnomer of "expenses" or "costs" to EHS "investments" providing financial payback.

When we incorporate financial analysis into the EHS decision making process, financial intelligence of your business is leveraged. Financial intelligence is the process of understanding the financial aspects of your business and how these decisions are made. Financial tools can be powerful and are useful in decision making, an essential tool for managers. When considering an

[7] American Society of Safety Engineers (ASSE). May 2007. SH&E Investment: Why Senior Management Should Commit & How SH&E Professionals Can Convince (retrieved September 6, 2009) (www.asse.org/practicespecialties/bosc/docs/BusinessofSafetyArticle.doc), p. 3.

EHS project that will require a financial investment, these tools will enhance your decision making ability, because they factor opportunity cost (cost related to the next-best choice available)8 and the cost of capital (rate of return that capital could be expected to earn in an alternative investment of equivalent risk)9. Considering the opportunity cost for an EHS related project, the purchase of a portable gas detector to assist with odor investigations verses extended production downtime or hiring of an outside consultant. Which is the better choice? The cost of capital to determine if an investment is worthwhile takes into account the cost of dept, rate of interest paid and the cost of equity (risk-weighted projected return required by investors, where the return is largely unknown).10 For project to be funded, the expected return on capital must be greater than the cost of capital.

Time-Value of Money

To be able to understand financial analysis, the time-value of money principal must be discussed. Money received today is worth more than a future equal amount. One hundred dollars in your bank account today is worth more than $100 you collect tomorrow and much more than you would collect 5 years from now. This is because of risk and interest. You can spend money you have today but to spend $100 you hope to have tomorrow or 5 years from now, you must wait till you have it. In addition, a lender expects to be paid interest for loaning money. As such, timing of cash flow must be factored into management decisions

Let's take an example of two investments: Investment #1 and #2. Investment #1 includes a building purchase for $750K and was sold three years later for $1.125M. Investment #2 has the same building purchase price but sells in 1.5 years for the same amount, $1.125M. Both examples have the same return on investment, 50%, but Investment #2's return was achieved in half the time, making it a better investment choice. This is the basic principle around capital investment business decisions, spending cash with the expectation of obtaining a return on your investment, sometime in the future.

Financial terms that will be presented in this paper include **present value**, **net present value**, **payback period**, **return on investment** and **internal rate of return**.

Financial Calculation Model for EHS Programs

Seven basic steps are recommended when performing financial analysis for EHS projects and programs.

1. **Perform an initial EHS assessment to determine risks**. This information could include hazardous waste disposal, employee injuries & illnesses, or business interruption from fire alarm related building evacuations and odors investigations.
2. **Calculate EHS risk costs**. Consider both direct and indirect costs. Indirect costs can be up to 20 times the direct cost.[11] Later these costs will be converted to present value terms.
3. **Determine programs needed to reduce the EHS risk**. Programs could include training, chemical product substitution, ergonomic furniture upgrades, anti-slip mats installation or hiring of an additional staff member.

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[8] Wikipedia, Opportunity Cost, (retrieved February 23, 2011) (http://en.wikipedia.org/wiki/Opportunity_cost). p. 1.

[9] Wikipedia, Cost of Capital, (retrieved February 23, 2011) (http://en.wikipedia.org/wiki/Cost_of_capital). p. 1.

[10] ibid., p. 1.

[11] American Society of Safety Engineers (ASSE). June 2002. ASSE Position Statement: *White Paper Addressing the Return on Investment for Safety, Health, and Environment (SH&E) Management Programs* (retrieved September 6, 2009) (http://www.asse.org/professionalaffairs_new/positions/roi.php), p. 2.

4. **Project investment costs and timing associated with the EHS program**. Calculate the financial investment of resources necessary to implement the EHS program. Since many EHS programs take several years to implement, determine the timing and cost for each phase. Later these costs will be converted to present value terms.
5. **Estimate the magnitude of savings and timing associated with the EHS program.** Savings could be chemical or hazardous waste reductions and lowered workers compensation insurance premiums. Consider both direct and indirect costs. Since savings is realized over a period of time, it may be necessary to calculate the projected savings over several years. Later these savings amounts will be converted to present value terms.
6. **Perform financial analysis to determine the feasibility of the program.** These calculations may include present value, net present value, payback period, return on investment and internal rate of return. Once these figures are available, financial viability of the program can be considered. It may be necessary to adjust investment costs or set different risk reduction targets to make the program feasible.
7. **Track the progress and success of the program.** Assuming the program is funded; establish metrics to ensure the program is fully implemented and that savings have been realized. If targets are not met, EHS professionals can illustrate reasons for the program issues and make adjustments as necessary.

This seven step process can be straight forward but estimating some of the investment costs and anticipated savings can be difficult to quantify. Calculating these values is educated guesswork and an art form needed to develop key assumptions. Values such as anticipated savings, identifying indirect costs, and determining future interest rates are all best estimates. The longer the outlook for a particular program, the more estimation is necessary.

Present Value (PV)

The **present value** calculates today's value of the future cash flow. Present Value (PV) is commonly used in capital expenditure analysis such as real estate and equipment purchases. Instead of using an interest rate, you use a "discount" interest rate to bring the future value back to a present value. Assumptions on the investment and discounted interest rate must be made.

Let's assume we believe an investment will grow a business (or generate savings as in EHS programs) by $100K in cash flow per year over the next three years. If you want to know whether the investment is worth what it is going to cost you, you need to know what that $300,000 would be worth today. If the $300,000 payoff is worth only $275,000 right now, you don't want to spend $275,000 on the investment.

Present value (PV) is represented numerically as follows:

$$PV = F_1/(1+r)^{1} + F_2/(1+r)^2 + \ldots + F_n/(1+r)^n$$

F = Future cash flow, benefit or savings

r = interest (or discount) rate

n= number of periods or years

Assuming a future cash flow (F) of $5,000 a year from now (n=1), the present value (PV) would be $4,545; using an interest rate (r) of 10%.[12] Similarly, the same future cash flow of $5,000 two years from now (n=2) would equal $4,132, and in three years (n=3) would be $3,756, using the same interest rate.[13] As you can see, the greater the number of years or farther into the future to predict cash flow, the lower the present value.

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[12] Heim, William, *"Financial Analysis for EHS Professionals – Understanding and Using Financial Analysis Tools"*, Proceedings of EHS Managers Conference, Monterey, CA. 2005. p. 4.
[13] Ibid., p. 4.

Net Present Value (NPV)

The **net present value** is the dollar value of an expected return and indicates the magnitude of a project. Net present value is calculated by summing the present value of the net benefits (or savings) for each year over a specified period of time and then subtracting the initial costs of the project.

Net present value (NPV) is represented numerically as follows:

NPV = [(F1/(1+r)1 + F2/(1+r)2 + …)] – [Costs]

F = Future Cash Flow, benefit or saving

r = interest (or discount) rate

n= number of periods or years

Net present value is a standard method for using the time-value of money to appraise long-term projects. Used for capital budgeting and widely throughout economics, it measures the excess or shortfall of cash flows, in present value terms, once financing charges or other costs are met. A positive NPV means that the project generates a profit while a negative NPV indicates that the project generates a loss.

Let's use the same data from the present value example of $5,000 in savings per year. The summation of three years of present value savings totals $12,433 minus the $10,000 of initial costs calculates a net present value of $2,433.[14] We now know the magnitude of project savings and with the net present value being positive, we have determined the program would create savings. The limitation with net present value is that we do not know when the savings or benefit occurs in time.

Payback Period (PP)

The **payback period** is the time required for the financial benefit to equal the initial investment. The PP is a simple calculation and is usually expressed in terms of years or months. The payback period does not indicate the magnitude of a project just how long to recoup the initial investment.

In the previous example, if we average the annual net savings for the three years ($12,433/3 = $4,144) and divide the total cost by the average net savings ($10,000/$4,144 = 2.4), the payback period is calculated to be 2.4 years.[15] Payback period is a term easily understood and does not factor the time-value of money. The payback period is commonly used in energy efficiency projects.

Return on Investment (ROI)

The **Return on Investment** is a financial measure used to evaluate the attractiveness of one investment to another. ROI calculates present value of savings over a time period divided by initial costs in terms of percent. The Return on Investment will not tell you the magnitude of the project.

Return on Investment can be expressed as:

ROI = [(PV1 + PV2 + …+ PVn) / Initial Costs] * 100

PV = Present Value

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[14] Op. cit., Heim, p. 5.
[15] Ibid., p. 6.

n= number of periods or years

Using the previous example, the ROI = [($12,433) / ($10,000)] * 100 = 124% for 3 years or formally stated, the 3-year ROI is 124%.16 Each company or project may specify a different time period for the ROI analysis.

Internal Rate of Return (IRR)

The **Internal Rate of Return** is the ratio of a financial investment either gained or lost relative to the amount invested. The IRR calculates a percentage rate to discount net savings until they equal initial costs. The Internal Rate of Return is similar to net present value, instead of selecting a discount rate and calculating the PV of the investment, the IRR calculates the actual return provided by the expected cash flows.[17]

The IRR is a very complex calculation and is used to compare projects. The higher the IRR, the better the investment. Utilizing a financial spreadsheet calculator tool with the previously referenced example, the IRR is calculated to be 23%.[18] Many companies establish a **hurdle rate** of 12%, the minimum rate of return on a project to determine if the investment passes the financial test.[19]

Ergonomic Program Improvement Financial Calculation Example

Now that we are familiar with many of the key financial analysis tools, we will demonstrate our knowledge with an example. Let's imagine an organization with ergonomic risks, develop a program improvement strategy to reduce risk and save the organization money. We follow the seven basic steps starting with an ergonomic risk assessment and calculation of costs. Through the organization's workers compensation administrator, we have determined that the company spends $500K/year in ergonomic claims and over a four year period this totals $2M. The EHS assessment identifies ergonomic program opportunities including training, furniture purchases and the use of a contract ergonomist. These theoretical costs are summarized in Table 1 below.

Year	Software	Furniture	Contract Ergo	Total Costs
1	$ 10,000	$ 30,000	$ 50,000	$ 90,000
2	$ 0	$ 10,000	$ 40,000	$ 50,000
3	$ 0	$ 10,000	$ 25,000	$ 35,000
4	$ 0	$ 10,000	$ 10,000	$ 20,000
			Total Costs =	$ 195,000

Table 1. Ergonomic Program Investment Costs

Based on our EHS program understanding, we believe that the organization can reduce ergonomic risk and achieve a total savings of 12.5% from the total $2M of ergonomic workers

[16] Ibid., p. 7.

[17] Karen Berman, Joe Knight, and John Case, "Figuring ROI The Nitty-Gritty – How To Calculate and Understand Return on Investment," Harvard Business Press, excerpted from Financial Intelligence for Entrepreneurs: What You Really Need to Know About the Numbers, (Business Literacy Institute, Inc. 2008), p. 7.

[18] Op. cit., Heim, p. 8.

[19] Wikipedia, Minimum acceptable rate of return, (retrieved February 23, 2011) (http://en.wikipedia.org/wiki/Minimum_acceptable_rate_of_return). p. 1.

compensation policy costs over a four year period. Estimated savings is anticipated to be $250K. This information is summarized in Table 2 below.

Year	WC Claim Reduction	Other Savings	Other Savings	Total Savings
1	$ -	$ 0	$ 0	$ -
2	$ 25,000	$ 0	$ 0	$ 25,000
3	$100,000	$ 0	$ 0	$ 100,000
4	$125,000	$ 0	$ 0	$ 125,000
			Total Saving =	$ 250,000

Table 2. Estimated Ergonomic Savings

A financial spreadsheet calculator tool can now be used to conducting the financial analysis of the program investment costs and estimated savings. We will assume a 10% interest (or discount) rate. The financial measures calculated for this project are summarized in Table 3 below:

Year	Savings	Net	Financial Measure	Value
1	$0	-$90,000	PV (Savings)	$181,000
2	$25,000	-$25,000	NPV (Savings)	$18,000
3	$100,000	$65,000	ROI (gross)	111%
4	$125,000	$105,000	IRR	18%
Total	$250,000	$55,000	PP	4.3 years

Table 3. Ergonomic Program Improvement Financial Measures

The results of the financial measures demonstrate a program improvement that will save money for the organization. This exercise calculated a present value savings of $181K and a net present value savings of $18K. The project demonstrated a 4-year ROI of 111% with an internal rate of return at 18%, greater than the organization's hurdle rate of 12%. The payback period was calculated to be 4.3 years. An EHS professional can now communicate this proposed $195K EHS program expenditure with financial analysis demonstrating a return on investment. As this project was to be implemented, the EHS program metrics and financial performance should be tracked and adjustments made as appropriate.

Summary

Now that we understand many of these financial measures and have demonstrated how to calculate the values, how do we actually perform these calculations in a workplace setting? There are plenty of resources available online and within reference libraries to assist you with determining your EHS business financial value. Numerous articles have been published on EHS return on investment and other EHS business value propositions. Financial calculators and spreadsheets software programs such as Microsoft Excel have many of these measures ready to use. Check with your company's finance department and utilize their tools and methodology. Each company will have their own minimum ROI and hurdle rate criteria.

Make your business case for EHS investments by reviewing and learning ROI calculations and financial models. Partner with your company's financial representatives; have them do the work for you! Incorporate financial analysis into your EHS assessments, program reviews and project proposals. Set financial scorecard targets along with your EHS metrics. Learn to speak to business leaders in financial terms. Utilize these financial analytical skills to justify EHS

programs that go beyond compliance to reduce risk and provide a financial payback to your organization.

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