Making a business case for safety

Simple ROI Techniques

Theresa Stack, CSP, CPE
Assistant Professor
MontanaTech
Safety, Health and Industrial Hygiene

What will we cover today

- Economics of safety and health
- Current state
- Return on investment
  - Injury Aversion
  - Productivity
  - Profitable
  - % of Payroll
  - Per employee

Before we begin.... Economics

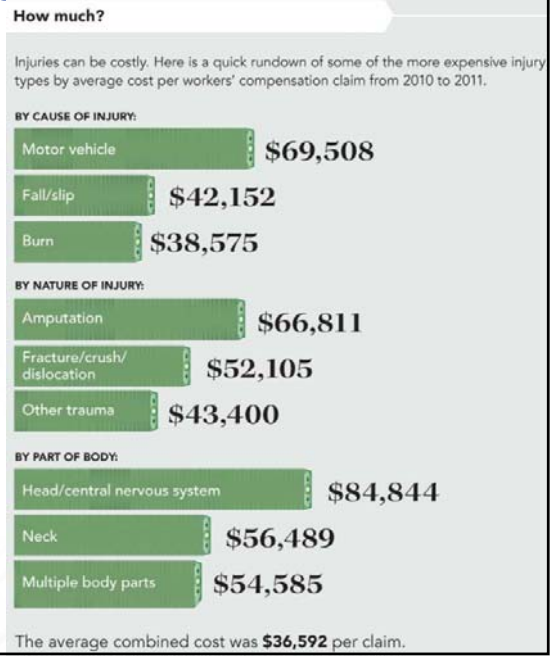
Occupational Safety and Health
ETHICS, Legality & Finances

- **Economics** is a science which studies human behavior as a relationship between ends (outcome) and scarce means (resources).
- **Economics** seeks ~ efficient utilization of resources to meet objectives

Incidents are inefficient, for the

.....**company**, the worker, or **society**

The cost of occupational injuries and fatalities.
(source 2014 Injury Facts)



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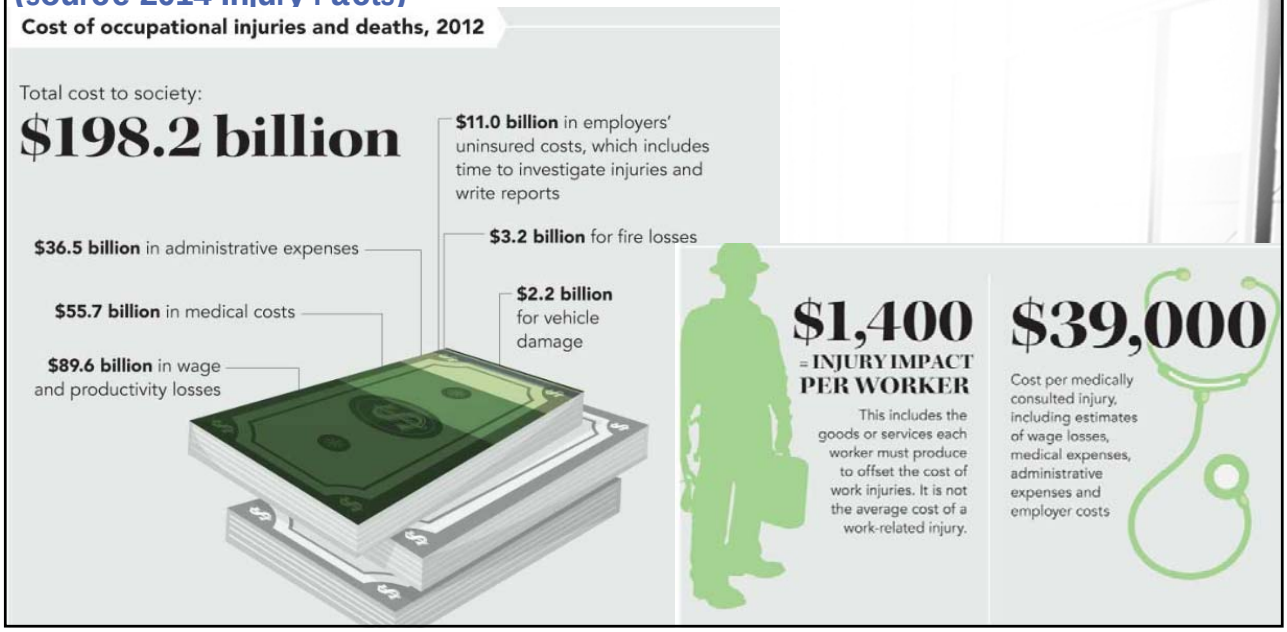


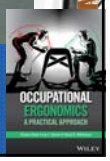
Economic of Safety Investments

- **Liberty Mutual**
  - For every $1 spent in direct costs; an additional $4-$5 spent for indirect costs
  - Conservative estimate **1:3 Ratio**

- **Return on Investment**
  - Direct costs
  - Indirect costs
  - Changes in productivity
  - Injury aversion
  - Short term
  - Long term
  - Trade-offs

Simple Return on Investment – injury aversion

Accommodation Ladders



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Simple Return on Investment – injury aversion

Accommodation Ladders

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Simple Return on Investment – injury aversion

Accommodation Ladders

Injuries associated with task over 6 years

Nature of Injury	Cost/Per Claim*	# of Injuries	Direct Cost
Sprain/Strain	$ 19,507.00	5	$ 97,535.
Cut/Laceration	$ 17,239.00	1	$ 17,239.
Contusion/Bruise	$ 17,870.00	1	$ 17,870.
Total Direct Cost			***$ 132,644.***

*Using the average total cost per claim by nature of the injury data as published the National Safety Councils Injury Facts 2010

**Assume for every $1 direct costs $3 indirect costs 132,633 X 3 =

Direct cost	$	132,644.
Indirect cost **	$	397,932.
Total injury costs	$	530,576.

Injury cost averaged over 6 years = $530,576. / 6 = ***$88,429.*** **per year**

Intervention

- **$377,000** design and build cost with a 10 year service life
- Annual estimated injury cost **$88,000**

Simple Return on Investment – injury aversion

Return on Investment Calculation

Pre-intervention Annual Injury Cost =	**$88,429**.
Post-intervention Annual Injury Cost =	$0.
Annual Cost Difference (**savings** if injuries are avoided) =	$88,429.
Expected Tool Service Life =	10 years
Improvement Investment =	**$377,000**.

Assume maintenance of new fixture = work stand replacement coast

Simple Return on Investment – injury aversion

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Expected Tool Service Life =	10 years
Improvement Investment =	$377,000.

ROI = 10 (annual cost of **pre-intervention)** – [**improvement cost** + {10 (annual cost of **post-intervention**}] =

10 ($88,429.) – [$377,000. + {10 ($0.)}] = $507,290

Service Life Cost savings = **$507,290**

Simple Return on Investment – injury aversion

Break Even Point

Annual Cost Savings =	$88,429.
Improvement Investment =	$377,000.

Improvement cost ÷ Annual cost **savings**

377,000 ÷ 88,429 = **4.26 years**

Break Even Point = 4.3 years

Simple Return on Investment – By Profit Margin

Sales Calculation for Injury with 3% Profit Margin

Pre-intervention Annual Injury Cost =	$88,429.
Profit Margin =	3%

Extra capital to pay for injury

88,429 / .03 = **$2,947,633**

Additional 3M in revenue to pay for the accidents

Simple Return on Investment – By Profit Margin

Sales Calculation for Injury with 3% Profit Margin

Additional 3M in revenue to pay for the injuries OR Additional 1.2M in revenue to pay for a solution

Extra capital to pay for injury per year

$88,429 / .03 = **$2,947,633.**

Extra capital to pay for intervention per year

$37,700 / .03 = **$1,256,666.**

Simple Return on Investment – by Employee

Costs per year by employee (N=10)

Additional 8.8K per employee to pay for the injuries OR Additional 3.7K in revenue to pay for a solution

Extra capital per worker for injury
88,429 / 10= **$8,842**

Extra capital per worker for solution
37,700 / 10 = **$3,770.**

Simple Return on Investment – Productivity

6 LWD, estimated cost $7100, Cost of improvement per truck $3000
Saved 10 min per stop per day

Simple Return on Investment – Productivity

6 LWD, estimated cost $7100, Cost of improvement per truck $3000 and Saved 10 min per stop per day

Simple Return on Investment – Productivity

Step 1. Pre-Intervention Costs

Labor = 25 min per stop = .4167 hr per stop

.4165 hr / stop x 10 stops / day = 4.167 hr / day

4.167 hours / day x 5 workers = 20.835 workers hours / day

20.835 worker hours / day x 240 days / year =
50,004 worker hours / year

50,004 worker hours / year x 25.00 dollars / worker hour =
$125,010.00 per year

Total Annual Cost: $125,010.00

6 lost work days, estimated cost $7100, cost of improvement per truck $3000

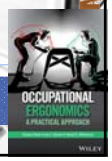
Simple Return on Investment – Productivity

Step 2. Post-Intervention Costs
Labor = 10 min per stop = .1667 hr per stop
.1666 hr / stop x 10 stops / day = 1.667 hr / day

1.666 hours / day x 5 workers = 8.335 workers hours / day
8.335 worker hours / day x 240 days / yr = 2000.4 worker hr / yr
2000.4 worker hours / year x 25.00 dollars / worker hour =
$50,010.00 per year

Total Annual Cost: $50,010.00

6 lost work days, estimated cost $7100, cost of improvement per truck $3000



Simple Return on Investment – Productivity

Step 3. Annual Cost Difference
Pre-Intervention Costs – Post-Intervention Costs =
$125,010 – $50,010 = **$75,000**

Step 4. Expected Intervention Service Life (Expected Tool Service Life)
10 Years

Step 5. Improvement Cost (Tool Purchase Price)
Tool Purchase Price (5 units)= $14,500
Installation (5 units) = $2,500
Expected Maintenance over 10 years = $5,000
Total Improvement Cost: = $22,000

Simple Return on Investment – Productivity

Pre-Intervention Annual Cost	$125,010.00
Post-Intervention Annual Cost	$50,010.00
Annual Cost Difference (Savings)	$75,000.00
Expected Tool Service Life	10 Years
Return on Investment (Per 10 year period)	
Improvement Cost	**$22,000.00**
Cost Savings	**$728,000.00**
Break Even Point	107 Days

Return on Investment 10 years

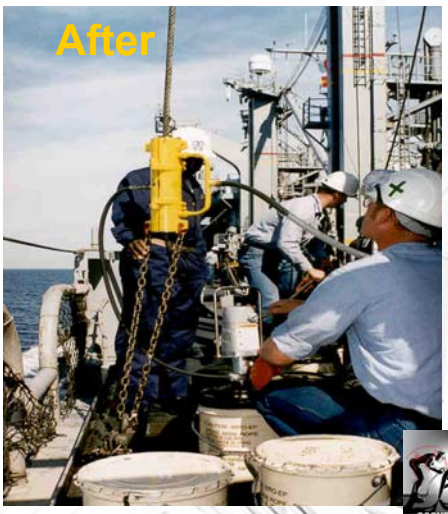
= 10 (annual cost of **pre-intervention**) – [**improvement cost** + {10 (annual cost of **post-intervention**}] = 10 ($125,010.) – [$22,000. + {10 ($50,010.}] = **$728,000**

Break Even Point

Improvement cost ÷ Annual Cost Savings

22,000 ÷ 75,000 = **.2933 yr** x 365 days/yr **= 107 days**

Simple Return on Investment – Waste Reduction



Saved 13 hr per crane + 65K in consumables + 45K in waste disposal

Simple Return on Investment – Waste Reduction

Pre-Intervention Annual Cost	**$320,420.86**
Post-Intervention Annual Cost	$34,206.38
Annual Cost Difference (Savings)	$286,214.48
Expected Tool Service Life	10 Years
Return on Investment (Per 10 year period)	
Tool Purchase Price (5 Units)	$8,200.00
Cost Savings	$2,853,944.80
Break Even Point	10.5 days

Step 1. Pre-Intervention Costs (Manual Process)
Consumables = $81,228.80 year
Waste Disposal = $45,848.06 year
Labor =
16 hr/ crane x 38 cranes = 608 hours
608 hours x 6 workers = 3648 worker hours
3648 worker hours x 13.25 dollars/ worker hours = $48,336
$48,336 x 4 (times year) x 4 = $**193,344 year**
Total Annual Cost:
Consumables + Labor + Waste Disposal = **$320,420.86**

Simple Return on Investment – Waste Reduction

Pre-Intervention Annual Cost	$320,420.86
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Break Even Point	10.5 days

Step 2. Post-Intervention Costs (Automated Cleaning / Lubrication Process)
Consumables = $15,887 year
Waste Disposal = $193.34 year
Labor = 3 hours / crane x 38 cranes = 114 hours
114 hours x 3 workers = 342 worker hours
3648 worker hours x 13.25 dollars/ worker hour = $4,531.50
$4,531.5 x 4 (times year) x 4 = $**118,126 year**

Total Annual Cost: Consumables + Labor + Waste Disposal = **$34,206.38**

Simple Return on Investment – Waste Reduction

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Expected Tool Service Life	10 Years

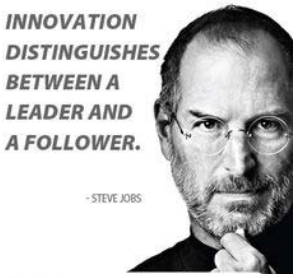
Return on Investment (Per 10 year period)	
Tool Purchase Price (5 Units)	$8,200.00
Cost Savings	$2,853,944.80
Break Even Point	10.5 days

Step 3. Annual Cost Difference
Pre-Intervention Costs (Manual Process) – Post-Intervention Costs (Automated Process) =
$320,420 – $34,216.38 = **$286,214.48**

Step 4. Expected Intervention Service Life (Expected Tool Service Life)
10 Years

Step 5. Improvement Cost (Tool Purchase Price)
Tool Purchase Price (5 units)= $7,500
Expected Maintenance over 10 years = $700
Total Improvement Cost:$7,500 + $700 = **$8,200.00**

Simple Return on Investment – Waste Reduction



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Cost Savings	**$2,853,944.80**
Break Even Point	10.5 days

Step 6. 10 Year Cost Savings
10 (annual cost of pre-intervention) – [improvement cost + {10 (annual cost of post-intervention}]
10 ($320,420.86) – [$8,200 + {10 ($34,206.38)] = **$2,853,944.80**

Step 7. Break Even Point
Improvement Cost / Annual Cost Savings
$8,200 / 286,214.8 = .0286
.0286 * 365 = **10.45 days**

Making a business case for safety

- **ROI by Injury Aversion**
- **ROI by Productivity**
- **ROI by Profit Margin**
- **ROI by Cost per Employee**
- **ROI by Percentage of Payroll**
- **Break Even Point**

"Hindsight is a wonderful thing but foresight is better, especially when it comes to saving life, or some pain."

William Blake

"Safety is not an intellectual exercise to keep us in work. It is a matter of life and death. It is the sum of our contributions to safety management that determines whether the people we work with live or die."

Sir Brian Appl

Good Ergonomics is Good Economics

http://www.nsc.org/MembershipDocuments/JSE-BusCase.pdf

"It is not enough to be right. You have to be right at the right time[11]."

http://www.pshfes.org/cost-calculator

Download the calculator and supporting documentation with the links below.

- *Washington State Ergonomics Cost Benefit Calculator*
- *Ergonomics cost benefit calculator instructions* (also available in *PDF format*)
- *Washington State Ergonomics Cost Benefit Calculator Example Palletizing Solution*
- *Ergonomics cost benefit case study collection* (also available in *PDF format* - links may not work in pdf version)
- *Ergonomics CBA summary* (also available in *PDF format*)
- *Ergonomics Cost Benefit Case Studies 250*

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