Demystifying Cost Justification for Ergonomic Solutions

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WEBINAR

Optimizing Human Performance
Agenda

1. An Approach to Cost Justification
2. Injury vs. Operational Justification
3. Review Data Sources available
4. Discuss “Blue” vs. “Green” dollars
5. Real Life Examples
Objective of Ergonomics

Injury Perspective

- Workers Comp
- Medical
- Safety

Traditional View of Ergonomics

Performance Perspective

- Engineering & Design
- Management
- Quality

Human Performance View of Ergonomics

Optimizing Human Performance
Case Study 1

Injury: 75% employees
Job: Repetitive grip force of 75lbs
Population: Predominately Women
Job Demand: Exceed Capabilities

Solution: Pneumatic Crimper
Cost: $500
ROI = (10,000 - 500) / 500
%ROI = 1,900

Job was designed without human capabilities in mind creating a reactive injury perspective approach
Current State of Ergonomics

What is current state of ergonomics within your company?

- Reactive or proactive
- Injury or risk driven
- Is funding available for projects or is it a struggle
- Has funding been denied
- Has your strategic ergo plan been unsupported by management
What Does the Boardroom Want?
Boardroom Wants

Improve Company Bottom Line and Achieve Goals:

• Improve efficiency of operations
• Reduce defects related to the quality of products
• Introduce new products /services quicker to market
• Reduce overhead
• Expand margin
• Increase ROIC
• Safer operations
• Basically: do what we do better, faster, cheaper, & safer

Can ergonomics help achieve these goals?
Future State of Ergonomics

- Facts and data must drive the process
- Align with board room company goals
- Demonstrate impact ergonomics has on company goals and employee safety
- Calculate the actual “Value to Operational Human Excellence” to create “pull” not “push”
Operational Human Excellence™

- People are the biggest source of productivity, quality, cost, and safety.
- Minimizing NVA waste, overburden and variation related to people can improve production, quality, reduce costs and improve health & safety.
- Follow DMAIC process
Case Study 2: Define & Measure Problem

Define

- High # injuries
- Employee complaints
- Production Issues

Measure

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Non-value added and high risk movements
Case Study 2: Analysis and Improve

Align solutions to company metrics

Human Modeling

Build Prototype
Case Study 2: Verify and Control

- 30% reduction in ergonomic risk
- 33% reduction in cycle time
- Payback = 1 month
Why Use This Approach

• Improvements prioritized (funded) based on increasing efficiencies, company metrics, and risk reduction

• Creates a proactive approach to improving workplace conditions: No injury is required

• Supports overall financial goals of organization (Make/Save $$$)
Not that we don’t believe you …. But can you show us the cost savings?
What is Language of Business
Cost Benefit and Ergo / Safety

• In beginning, ergo programs/solutions do not require CBA.
  • Right thing to do
  • High # injuries
  • OSHA citation
  • Low hanging fruit

• “Moral Right” to promote ergo/safety often overlooks economic implications of a project.
Cost Benefit Ergo Challenges

• Ergonomist present benefits qualitatively and costs quantitatively
• Present cost of a project, but do not do a good job of presenting its value
• Creates an unbalanced view
• Need to show impact on the bottom-line
• Creates long term sustainability and value of program
What is Cost Benefit Analysis (CBA)

• Systematic process for calculating and comparing benefits and costs of a project, decision or policy.

• Technique used to determine options that provide the best approach for the adoption and practice in terms of benefits in labor, time and cost savings.

• A financial tool to assist in asserting our point of view about need for (worth) of one’s ergo intervention.

• Powerful tool present our argument for funding a project.
Purpose of CBA

1. To determine if a project is a sound investment (justification/feasibility).

2. To provide a basis for comparing projects.
   - Compare total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.
Accounting

- Traditional accounting systems focus on financial concepts related to:
  - Assets and Expenses (Taxation, Regulation, Financial Accounting)
  - **Assets = Money coming in** (something you can sell)
    - Buildings, machines, equipment, inventory
  - **Expenses = Money going out**
    - People, Health & Safety, Ergonomics
Capital Budgeting (CB)

• Used to help determine which projects should the company invest in
• Used to evaluate investments, rank them and suggest choices
• Investment decisions fall into 3 basic decision categories:
  1. Accept or reject a single investment project
  2. Choose one competing investment over another
     (choice of options-alternative solution)
  3. Capital rationing / ranking
     (Limit capital budget, which projects should be chosen)
Sit-Stand Workstations Example

Option 1

Option 2

Option 3
Return On Investment

Without ROI, projects and programs are relegated to level of “nice to do” and funding is continually at risk

Financial gain is needed to get management buy-in
Cost Justification

WIIFM

What’s In It For Me
Optimizing Human Performance

WIIFM Shopping Mall Analogy*

*From Auburn Engineers
CBA Basics

CBA is a powerful tool to present our argument for funding an ergo project (another tool in our tool box)

CBA Steps:
1. Identify Costs of a Project/Solution
2. Identify Benefits of Project/Solution
3. Benefits > Costs
CBA Methods

Several methods depending on need and complexity of project

• Payback Period
• Benefit/Cost Ratio
• ROI
• Net Present Value
• Internal Rate of Return and Profitability Index
• Losses vs. Goods Sold
  • Volume of sales to offset loss = cost of losses/profit margin
Return On Investment Calculation

• ROI is used to measure rates of return on money invested in order to decide whether or not to undertake an investment

ROI = (Benefit – Cost) / Cost

• Common to express ROI as a percentage

%ROI = 100 x (Benefit – Cost) / Cost
- 1 year and 3 year ROI are common

• Very common with Ergo Cup projects
Example

Costs =

Benefits =

Is this cost beneficial?
Data Sources

The following data sources can be used to cost justify an ergonomics project:

2. Human Resources
3. Operations
1. H&S Data – Injury Method

• Most common approach for H&S professionals
• Review past injuries and related costs (medical and Workers Comp)
• Predict avoidance of future injury costs based on historical trends and types of past injury
• Known as “Cost Avoidance Model”
• Great if there are a lot of injuries
• Bad if no or few injuries
Injury Analysis Examples

- **Walking**: 3.3%
- **Twisting**: 10%
- **Squatting**: 2.2%
- **Misc**: 12.2%
- **Exercising**: 1.1%
- **Fall**: 10%
- **Kneeling**: 22.2%

- **Knees - Age**
  - 50's: 30%
  - 40's: 20%
  - 60's: 40%
  - 70's: 20%

- **Knees - Area**
  - NC: 70%
  - Repair: 60%
  - Other: 50%
  - Maintenance: 40%
Example of Cost Avoidance

Injury Costs $10,000
Indirect Costs = 4x or ($40,000)
Cost Avoidance = $50,000 (10K + 40K)
Does this make sense?
Can you sell this to this guy?

Challenge with cost avoidance method is most financial experts do not consider indirect costs that are not justifiable (very common in H&S)
Cost Avoidance Model

Direct Cost

Indirect Costs of Injuries

Less expensive claims have proportionally higher indirect costs.

- $0 - $2,999 = 4.5 x claim cost
- $3,000 - $4,999 = 1.6 x claim cost
- $5,000 - $9,999 = 1.2 x claim cost
- $10,000+ = 1.1 x claim cost
1. H&S Data – Ergo Risk Method

- Quantify ergo risk of operation
- Quantify ergo risk reduction from solution and compare it to original risk
- Epidemiological evidence shows increased risk leads to increase frequency/severity of injuries and costs
- Used as you move from a reactive to a proactive program
Case Study 3– Risk Evaluation

Ergo Risk Evaluation

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Risk Level: Low, Moderate, High-Moderate, High
Case Study 3 – Risk Reduction & Solution

[Image of boxes stacked on a pallet]

[Bar chart showing lifting index for short and long reach, with a 29% risk reduction for short reach and a 37% risk reduction for long reach.

Lifting 60lb Box

- Current
- Predicted

Short Reach
Long Reach

37% Risk Reduction
29% Risk Reduction
2. Human Resources Data

1. Labor Turnover – Replacement Workers

A. Acquisition Costs:
   - Recruitment Costs, Selection & Hiring Costs

B. Development & Training Costs (new Employee):
   - Training and Ramp Up Productivity

C. Separation Costs:
   - Severance pay costs, Low performance costs (losses in productivity before employee leaves), Vacant position costs (OT, loss of sales, etc.)
2. Human Resources Data

2. Absenteeism

A. Compensation costs
B. Medical costs
C. Replacement costs
D. Standard costs vs. development costs
E. OT / Sub-optimal or additional labor
3. Operations Data

- Uses industrial engineering methods to tap into process improvement funding
- Lean (eliminate waste & NVA activities)
  - NVA motions tend to be higher in ergo risk
  - Eliminate ergo risk = increased efficiency
- Six Sigma
  - DMAIC approach
  - Statistics to reduce variation and defects
3. Operations Data

1. Productivity (Labor):
   - Wages, OT, Turnover, Training, Supervision
   - Throughput (# units/shift)
     - Cost per unit – decrease employee time to complete a unit and labor cost to build
   - Cycle Time (time saved/shift)
     - Decrease cycle time through decreasing human motion waste

2. Quality
   - Scrap rate – value lost per shift
   - Rework – value of time spent fixing errors
3. Operations Data

3. Inefficiency / Downtime Factors
   - Machine run time, set-up time, breakdowns, warranty/product defects, delay in supply

4. Inventory (Excess inventory is bad)
   - Raw Material, Work in Process, Finished Goods

5. Operating Costs
   - Fuel, energy, electricity, equipment depreciation, maintenance
How to Get Funding
Green $ are Hard Savings

Reductions in Costs:

- Unit cost of operations (cost of sale)
- Unit cost of production
- Transaction costs
- Overhead costs
- Transportation costs
- Manpower

Increased Revenue:

- Throughput, resulting in increased sales or revenue
What Are Hard Savings

Real simple,

We are “No longer spending money on “X”,

or

We see “X” off the P&L statement
Hard Dollar Savings Example 4

• Cycle time reduction with no reduction in labor costs

• Increased throughput to meet customer demand
Blue $ are Soft Savings

• Reductions in cash flow
• Reduction in need for working capital
• Avoidance of capacity enhancement
• Conformation to changes in law
• Increased safety/ergo in workplace
• Increased employee satisfaction
• Increased customer satisfaction
Understanding the Data

Need to Focus on Green or Hard $ Savings to Get Full Management Buy-In and Funding
Savings (Benefits) Categories

- 4 categories of benefits A, B, C, D
- A easiest, on P&L for current period
- B hard savings, more in future (savings on balance sheet, cash flow, working capital)
- C soft savings, cost avoidance or capacity enhancement.
  - Savings will occur, but positive confirmation needed (i.e., bottleneck removed, expectation of more production)
- D right thing to do (safety, legal, environmental), but no proof or qualifiers
- Benefits run spectrum from A to D with soft savings becoming hard savings over time, once they are quantified
Best Data Sources

• Optimizing productivity/labor and reducing or eliminating quality issues can account for 80+% of a project's benefits

• Injury costs alone often cannot justify the costs of larger capital projects
  • Especially if there are few to no injuries
Return On Investment Calculation

ROI = (Benefit – Cost) / Cost

Benefits
- Productivity, Quality, Injury, Human Resources

Costs
- Labor, Equipment, Maintenance, Program

ROI = Benefits (P+Q+I+HR) – Cost (L+E+M)
  Cost (L+E+M)
Case Study 5

Differences between lifting 88 lbs. vs. 66 lbs. tank or using a tank assist
Case Study 5

- Both (88 & 66 lbs.) high risk for shoulder (destination)
- Tank assist reduces risk to shoulder
- $1,000 to install
- Modify rental agree to require tank assists
- ROI = 2,4000%
Case Study 6: Reducing Vibration

High # Injuries from Grinding
Case Study 6: Reducing Vibration

Tool Testing Vs. Gloves
Case Study 6: Reducing Vibration

65% Less Vibration

30% Lighter

2-3x Faster/Removal

ROI = 5,900%
Case Study 7: Knee Pad Study

• Engineering and Administrative Controls minimize risk, but did not eliminate risk
• PPE is needed
• Knee Pad Study
Case Study 7: Knee Pad Testing Results

- Gel knee pads are 2.5 times more comfortable
  - Gel knee had the highest comfort rating of 4.57 / 5
  - Rubber knee pad had the lowest comfort rating of 1.65 / 5

- Gel knee pad reduces pressure by 40%
Should The Company Invest in Gel Knee Pads?
Should We Invest in Gel Knee Pads?

- Current knee pad is $5
- Gel knee pads are $33
  - $27 more or 6.6x more expensive

Can the increase in costs be justified?
Case Study 7: ROI

Costs:
• 100 recordable knee injuries / year
• $2M (direct cost)
• 52,000 lost labor hours
• Total Cost = $4.5M

• 35% of knee injuries are kneeling
  ➢ 39% of claims and 42% of costs
  ➢ Avg. Rec = $23K, Avg. LT = $42K
Should We Invest in Gel Knee Pads?

- Current spend is $27K / year on knee pads that do not provide level of protection to reduce risks
- Propose spending $26.5K to procure 800 gel knee pads and issue to high risk jobs who routinely perform kneeling work
- Estimated ROI = 1.05 months
  - 30% risk reduction
  - Prevent 7 injuries, save 1,000 lost labor hours, save $300K
Conclusion

• Ergo often viewed as a means to prevent injuries

• Without a financial benefit, ergo is just another overhead expense
  (doesn’t get done)

• Selling ergo as a “money maker”, that enhances profitability and provides a positive investment requires that ergonomists build bridges with financial personnel and recognize company’s profitability goals

• Injuries alone may not fully justify the cost to implement a solution

• Get help from Finance to understand “rules of game”
AEC Workshop

“Demystifying Cost Justification for Ergonomic Solutions”

Monday morning 8:00 – 12:00