

## Attachment L-4:

### Framing a Cost Benefit Analyses (CBA)

<b>Define the following:</b>	<b>Description</b>
<i>Step 1: The problem</i>	The objective of the study is to examine how the cost of the PHT-TLG intervention compares with the benefits.
<i>Step 2: Control options</i>	PHT-TLG engineering intervention versus no control
<i>Step 3: Audience</i>	Employers and employees, OBWC, unions
<i>Step 4: Perspective</i>	OBWC and insured establishment (a separate analysis for each)
<i>Step 5: Time frame and Analytic horizon</i>	Two years from PHT-TLG implementation ( <i>e.g. short enough that the outcomes are not unacceptably uncertain, but long enough to capture fully the costs and benefits that are attributable to the program, and to account for seasonal variations in program activity levels and targeted health outcomes</i> ),
<i>Step 6: Discount rate</i>	6% ( <i>to compare benefits and costs that occur at different times by adjusting their values according to the time preference corresponding to the chosen perspective</i> )
<i>Step 7: Format</i>	Prospective experimental design (with randomization and control)

<b>Benefits*</b>	<b>Costs*</b>
<p><b>Direct costs averted</b></p> <ul style="list-style-type: none"> <li>Averted workers' compensation costs (both medical and indemnity)</li> </ul> <p><b>Indirect costs averted</b></p> <ul style="list-style-type: none"> <li>Reduced or averted costs of absenteeism</li> <li>Reduced or averted costs of presenteeism+</li> <li>Reduced turnover costs</li> </ul> <p><b>Value Added</b></p> <ul style="list-style-type: none"> <li>Improved product quality (e.g. less damaged products from improved handling of appliances)</li> <li>Improved delivery efficiency (e.g. shorter delivery times and reduced personnel costs due to 1-person versus 2 person delivery)</li> </ul>	<p><b>Direct costs</b></p> <ul style="list-style-type: none"> <li>Cost of new/ replacement equipment</li> <li>Equipment maintenance</li> </ul> <p><b>Indirect (productivity losses)</b></p> <ul style="list-style-type: none"> <li>Productivity losses to company attributable to program</li> <li>Productivity losses to employees attributable to program</li> </ul>
<p><b>Intangible benefits+</b> Averted pain and suffering from back injury</p>	<p><b>Intangible costs+</b> Stress on employees caused by program</p>
<p>*For most benefits and costs, source of information will be establishment and OBWC records + Will not be estimated in this study</p>	

The formula for NPV, where:  $r$  = discount rate (interest rate),  $t$  = year, and  $n$  = analytic

$$NPV = \sum_{t=0}^n \frac{(\text{Benefits} - \text{Costs})_t}{(1+r)^t}$$

horizon (in years) is:

The formulas for ROI are presented below:

$$ROI = \frac{PV_{\text{benefits}} - PV_{\text{costs}}}{PV_{\text{costs}}}, \quad \text{or} \quad ROI = \left[ \frac{PV_{\text{benefits}}}{PV_{\text{costs}}} \right] - 1$$