ROI Calculator - Overhead Drill Press & Dust Control (Print Preview)

Project Description: Overhead drilling 1,860 holes using a traditional method with no dust control and drilling 1,860 holes using an overhead drill press with a dust control.

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	Traditional Method Without Dust Control	Overhead Drill-Press With Dust Control
Cost to purchase or lease & maintain	$ 450.00	$ 2,539.00
Cost to train & deploy	$ 0.00	$ 30.52
Worker productivity	$ 22,703.16	$ 11,351.58
Injury costs	$ 0.00	$ 0.00
Total cost	$ 23,153.16	$ 13,921.10

Comparison

Traditional Method Without Dust Control is $9,232.07 more expensive than Overhead Drill-Press With Dust Control

Notes

This example compares two crews, each consisting of two pipefitters, drilling overhead into concrete for variable air volume units in a new commercial building. One crew is using a traditional method: climbing a ladder to perform the drilling with arms overhead and no system for capturing the dust. The second crew is using the overhead drill press with a dust collection system. Use of the overhead drill press and dust collection system allows the worker to perform the task from ground level with arms at an optimal height and the dust generated is captured at the source. Researchers at Washington University worked with pipefitters and a contractor to collect information on the impact of these two methods on workers' productivity and risk. They found that use of the overhead drill press reduces the time spent performing the task and the risk for neck, arm, shoulder and forearm musculoskeletal injuries. The use of a vacuum to capture the dust before it becomes airborne also reduces the risk for exposure to silica dust. In this example, use of a hammer drill mounted on an overhead drill press with a dust collection system resulted in a savings of $9,232.07. Although the initial cost of the overhead drill press and dust control is higher than the traditional method, in this example, at the 245th hole the two methods break even (the point at which the productivity savings offset the cost of the equipment – and the cost of both methods is roughly equal). The savings per hole drilled thereafter increases exponentially. Click on any section you want to alter.

Purchasing and Leasing

Unit cost (purchase or lease)	$ 450.00	$ 2,525.00
Number of units purchased or leased	1.00	1.00
Maintenance cost (per unit)	$ 0.00	$ 0.00

Additional operating cost, including consumables (per unit)	$ 0.00	$ 14.00
Total cost	$ 450.00	$ 2,539.00

Notes

For this example, we assume 1 equipment set up for each crew at a cost of $450 for the traditional method ($300 for a hammer drill and $150 for a 6 ft. ladder) and $2,539 for the overhead drill press with dust collection system ($300 for a hammer drill, $1,875 for the overhead drill press, $350 for a dust control vacuum and $14 for an extra filter bag). Although the cost of the equipment could be expensed over time, for this example, the full cost of the equipment is expensed on this project. The price per unit is based on the current price of Telpro Inc.'s Drillrite model. Prices for the drill, ladder, vacuum and extra filter bag were obtained from the Internet in May 2014. We are assuming no additional maintenance costs for the equipment during this project. Click on any section you want to alter.

Training and Deployment

Number of workers trained	0.00	2.00
Hours of training per worker	0.00	0.25
Hourly wage + benefit	$ 61.03	$ 61.03
Other costs of providing training	$ 0.00	$ 0.00
Cost of safety gear per worker (ex. respirators, hearing protection, etc.)	$ 0.00	$ 0.00
Number of workers using safety gear	0.00	0.00
Other costs of deploying equipment, material, or work practices	$ 0.00	$ 0.00
Total cost	$ 0.00	$ 30.52

Notes

Based on discussions with pipefitters who have used the equipment, we are including 15 minutes of training for each worker when the overhead drill press is introduced. Although ladders would be needed for the traditional method, no additional training or deployment cost are included for this method. For this example, we have not included an additional cost for safety equipment. We are assuming that the workers are already covered by a respiratory protection program and provided with appropriate respiratory protection as needed. Respiratory protection would be determined by silica-exposure levels. Depending on the exposure, the cost of such protection could range from $40 for a half-mask cartridge respirator approved by NIOSH for silica to $350 for a full-facepiece respirator. Use of the dust controls could eliminate the need for a respirator or significantly reduce the type and cost of the respiratory protection required for this task. (Prices were obtained from the Internet in May 2014.) We recognize that wage rates and crew configurations may vary by craft and market. For this example, we are using a wage rate (including fringe benefits) for a pipefitter of $61.03 (St. Louis metro area -- Davis-Bacon Wage Determinations: Building Construction Type for pipefitters (PLUM0562-005, date accessed: May 2014)). Click on any section you want to alter.

Worker Productivity

Number of workers using equipment, material, or work practice	2.00	2.00
Number of hours per worker	186.00	93.00
Hourly wage + benefit	$ 61.03	$ 61.03
Total cost	$ 22,703.16	$ 11,351.58

Notes

This example is based on a project involving a crew of two pipefitters, drilling overhead into concrete for variable air volume units in a new 6-floor commercial building. There are 31 rooms per floor and each room needs to have 10 holes drilled overhead. Researchers at Washington University observed the time spent by pipefitters performing this work in a location where obstacles had been removed, and collected three measures of productivity from the workers and the contractor: 1) worker self-reported holes drilled per hour with each method; 2) worker estimated time to use the overhead drill press and dust collection compared to the traditional method; and 3) contractor estimated reduction in the duration of the job with the overhead drill press and dust collection system. Based on this input, the Researchers estimate that on average a crew will drill 10 holes per hour (including related tasks) with the traditional method and 20 holes per hour with the overhead drill press with dust collection. This is a conservative estimate of the productivity improvement. Worker self-reported estimates were as high as 5 times faster (50 holes per hour with the overhead drill press and dust collection) and a report from a contractor who used the prototype of the overhead drill press found that work was performed 3 times faster. For this example, we are using a wage rate (including fringe benefits) for a pipefitter of $61.03 (St. Louis metro area -- Davis-Bacon Wage Determinations: Building Construction Type for pipefitters (PLUM0562-005, date accessed: May 2014)). Click on any section you want to alter.

Injury Costs

Direct injury costs from using equipment, material, or work practice	$ 0.00	$ 0.00
Indirect injury costs from using equipment, material, or work practice	$ 0.00	$ 0.00
Total cost	$ 0.00	$ 0.00

Notes

Although we are not including the potential savings from preventing an injury or illness, it is important to note that if one rotator cuff (shoulder) injury is avoided by using the overhead drill press, there would be an additional savings of an estimated $17,239 ($8,209 in Direct Cost -- the average annual rotator cuff claim costs and $9,030 in Indirect Cost -- lost productivity, administrative costs, etc.) based on data developed by the Washington State Department of Labor and the Puget Sound Human Factors and Ergonomics Society. The total estimated cost of a "strain" injury could be much higher over the duration of the injury -- $70,408 ($33,528 in Direct Cost plus $36,880 in Indirect Cost) using OSHA's Safety Pays Program calculator. There could also be savings from preventing a silica-related illness by using the dust collection system. One "Dust Disease, NOC (all other pneumoconiosis)" claim is estimated to cost $27,561 in Direct Costs for the duration of the

workers' compensation claim and $30,317 in Indirect Costs (lost productivity, administrative costs, etc.). These figures are derived from OSHA's "Safety Pays Program" calculator, which can be found in the help icons above.

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About the CPWR Construction Solutions Return On Investment (ROI) Calculator

In addition to the positive effect on workers' well-being, health and safety interventions on construction sites can often result in cost savings for owners and contractors. This free, open access, web-based calculator can help owners, contractors and workers compute the financial return on an investment (ROI) in a health and safety intervention.

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