



# Interventions for Overhead Drilling into Concrete

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## Introduction

Overhead drilling into concrete is associated with the risks of falls from ladders, injuries to the wrist if the drill seizes, musculoskeletal disorders of the wrist, elbow, shoulder, or back due to the high loads as well as exposure to silica dust and noise.

### Usual Method



## Objectives

The objective was to develop a device that offered a safe alternative method for drilling overhead into concrete using an iterative development process involving feedback from workers across the electrical, plumbing, and sheet metal trades.

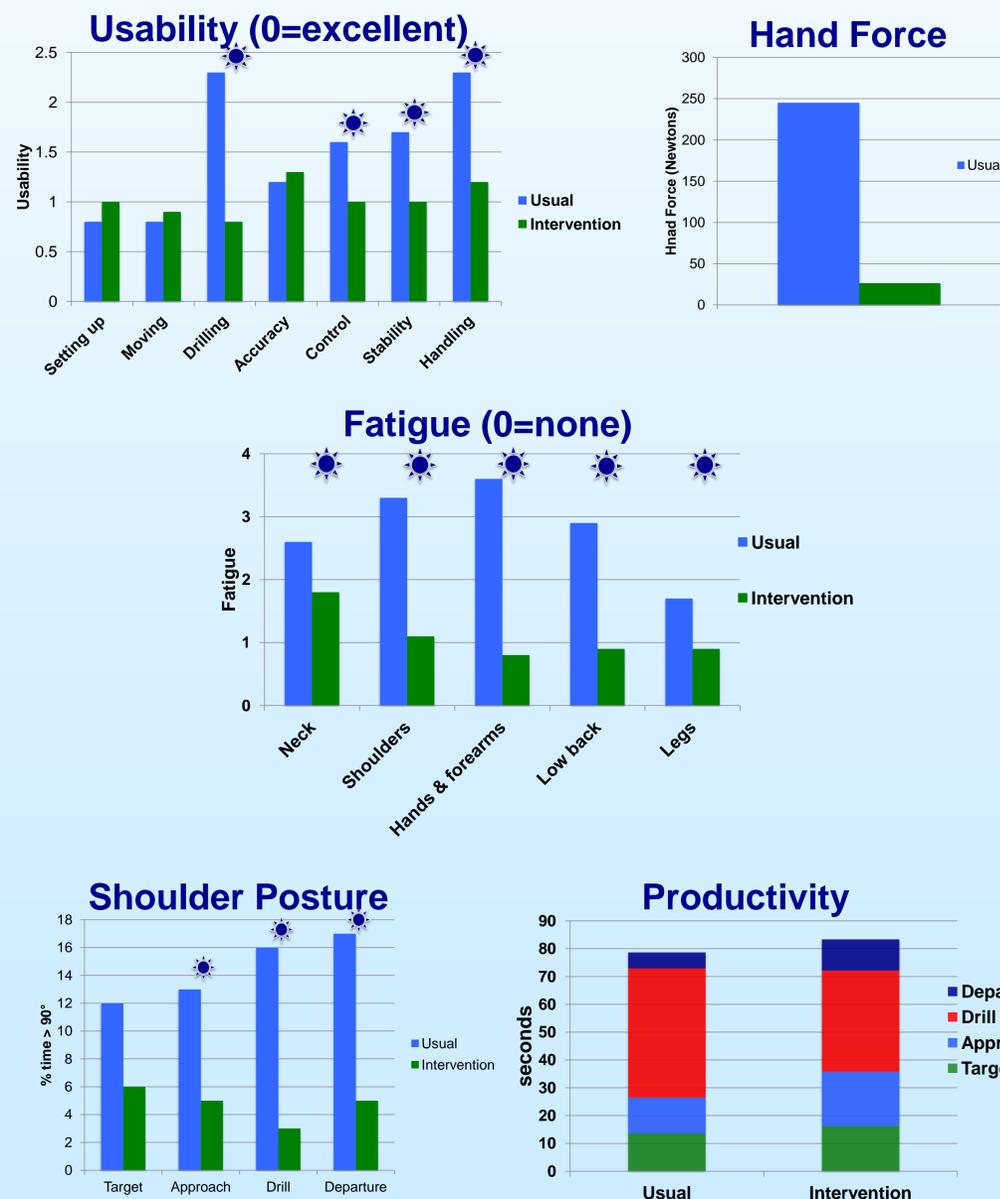
## Methods

More than 100 commercial construction workers evaluated different intervention devices and their usual method while performing their regularly scheduled overhead drilling. Seven different generations of device designs were tested.

Results for usability, fatigue, posture, and productivity assessment by 23 commercial construction workers are presented for the final 'Inverted Drill Press' design (Rempel et al., 2010).

## Results

The final design was rated better than the usual method across most usability ratings. There were no differences in productivity between methods. Levels of perceived fatigue were significantly lower in every body region for the intervention compared to the usual method. The forces required to drill were 10 times lower for the intervention than the usual method.



## Conclusions

Field testing by experienced construction workers was vital to the successful development of the device.

Several rounds of testing and redesign were required to achieve acceptable productivity and usability.

Respirable silica was reduced to below the NIOSH REL by adding a dust shroud (Cooper et al, 2012).

### Inverted Drill Press



## Future Work

We are developing a drill jig that holds larger drills and drills in any direction while capturing silica dust (Cooper et al. 2012). The inverted drill press is being manufactured by TelPro.

### Acknowledgements

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### References

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Michael R. Cooper, Pam Susi, and David Rempel. Evaluation and Control of Respirable Silica Exposure during Lateral Drilling of Concrete. *Journal of Occupational and Environmental Hygiene* 2012; 9(2): D35-41.