

# Leveraging Ergonomics for Economic Success

*An insight of floor finishing practices and their effect on people and profits*

By Lance Brown

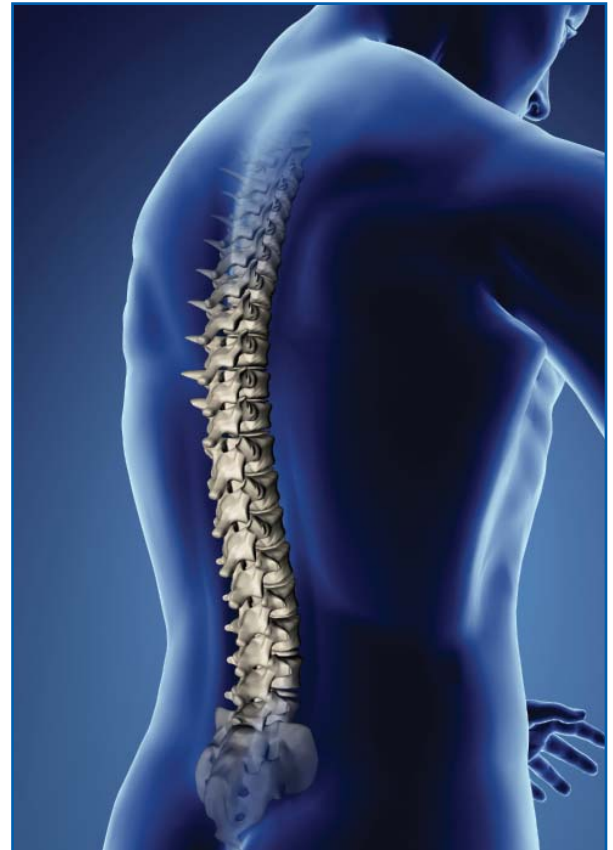
**Cleaning budgets have faced a gradual decline over the past several years—a situation that will be extended by the current economic downturn. As a result, more cleaning professionals are looking for increasingly creative ways to reduce costs while improving the quality of cleaning.**

In order to prosper with limited resources, cleaning professionals should demand more by using highly productive ergonomic tools. Tools with ergonomic features can improve both the quality of work performed and the health of the individual performing the work. In addition, ergonomic tools enable cleaning professionals to enhance their operation by improving productivity and cleanliness.

Simply defined, ergonomics is “the study of work.” It involves looking at the science associated with occupations and designing the job to fit the worker as opposed to forcing the workers’ body to fit the job. Tools fit to the worker help reduce physical stress on the workers’ body and the likelihood of musculoskeletal disorders (MSDs).

The Occupational Safety and Health Administration (OSHA) rates janitors and cleaners fifth on its list of top occupations at risk for MSDs. They are ranked behind nurse aides, truck drivers, non-construction laborers and assemblers.

This whitepaper will identify the productivity and labor savings associated with using ergonomically designed tools along with additional health and safety benefits to cleaning workers and the cleaning department. With a specific focus on floor care tools, it will identify the potential ergonomic impact of traditional floor finish application systems such as a mop and bucket system against new market innovations.



## That’s a Pain in the Back!

MSDs can result in a number of injuries to workers, including pain, numbness, tingling, stiff joints, difficulty moving, muscle loss and occasional paralysis. Each of these injuries can limit a worker’s productivity and/or result in absenteeism. In a study by the Bureau of Labor Statistics, 42,000 occupational injuries required time away from work in the janitorial industry. Of these, 15,200 were MSDs requiring a median of seven days away from work.

Parts of the body most likely to be affected by an MSD include arms, hands, fingers, neck, back, wrists and shoulders. Floor care specialists are at high risk for MSDs. Repetitive motions such as pushing heavy string mops back and forth across the floor result in twisting and turning. This causes excessive strain on the back and shoulders.

## OSHA details several catalysts for work-related MSDs, including:

- Awkward postures or unsupported positions that stretch physical limits
- Motion, such as increased speed or acceleration when bending and twisting
- Compression. Grasping sharp edges like tool handles reduces blood flow and nerve transmission and causes damage to tendons

Another MSD that accounts for a significant loss of productivity and large compensation costs is back injury. Workers cite back disorders most often, after the common cold and flu, as reasons for missing work. <sup>1</sup>

## The Cost of Poor Ergonomics

Labor accounts for 80 to 90% of a cleaning department's total budget. Just as cleaning professionals would protect a substantial investment in an auto-scrubber by ensuring regular maintenance, they must also protect their investment in staff and labor.

Each year, MSDs account for more than \$15 to \$20 billion in workers' compensation costs and 34 percent of all lost workday injuries and illnesses. According to OSHA, total direct costs add up to as much as \$50 billion annually. This means \$1 of every \$3 spent on workers' compensation can be attributed to MSD-related issues.

Workers who suffer from an MSD can take up to 28 days to recover from an injury like carpal tunnel syndrome. More serious injuries can take even longer, possibly presenting workers with permanent disabilities that may prevent them from returning to their jobs. <sup>2</sup>

When cleaning workers are absent for short or extended periods of time, new employees must be trained to complete their tasks, which results in additional labor cost. If a worker is unable to return to work because of the injury or leaves to find a less strenuous vocation, a new employee must be hired. Average costs to replacing entry-level staff and training new employees is between \$5,000 and \$7,000 per person. <sup>3</sup>

In addition to the cost of hiring a new employee, cleaning professionals note that finding new staff has become increasingly difficult. A Cleaning Management Institute (CMI) 2008 survey reveals that 52 percent of respondents had difficulty hiring new employees. As a result, cleaning professionals spend extra time finding someone to fill a position, adding to lost productivity.

There are numerous unexpected costs that a department can incur by not having the proper ergonomic systems in place. More cleaning professionals are realizing that tools that protect workers will also protect their bottom line.

### A Quick Look at Potential Cost-Savings through Improved Ergonomic Programs:

- Reduced turnover
- Reduction in training-related costs
- Fewer workers compensation claims
- Reduced absenteeism
- Improved productivity

## Improving Floor Finish Applicator Ergonomics

Three primary methods for applying floor finish exist, including mop and bucket, flat mop and backpacks. However, new innovations in the market are changing the way facilities finish floors. The **ProSpeed™/MC** system, a new floor finish applicator from JohnsonDiversey, is ergonomically designed and has completely disposable components. While there are several features and benefits of the **ProSpeed** system, this whitepaper will discuss the ergonomic attributes of its design compared to traditional mop and bucket methods.

With a traditional mop and bucket method, floor finish is poured into a bucket. Workers must then carry the bucket to the area where floors will be finished. Gripping a straight mop handle, they push the mop back and forth across the floor to apply the finish. Upon completion of the task, tools are returned to a utility area where they are cleaned and stored for later use.

The **ProSpeed** system eliminates the need for lifting a heavy bucket filled with finish. It is an ergonomically designed, lightweight unit built for users of any height. Workers simply link a connector tube to the pouch holding the finish and insert the connected pouch on the applicator handle. They are then ready to finish a floor. After the floor finish is applied, workers easily disassemble and discard the tube and applicator pad. Any leftover finish is stored for later use.

<sup>1</sup>"Ergonomics: The Study of Work," U.S Department of Labor, Occupational Safety and Health Administration, OSHA 3125, 2000 (Revised)

<sup>2</sup>"Ergonomics: The Study of Work," U.S Department of Labor, Occupational Safety and Health Administration, OSHA 3125, 2000 (Revised)

<sup>3</sup>"Team Cleaning Addresses Key Industry Issues," Jim Harris, Sr., 2004

## An Independent Study Takes a Closer Look at Muscle Strain

Regardless of what floor finish applicator method is used, there are numerous muscle groups used to apply floor finish. To identify which of these systems has the largest physiological impact, an independent study analyzed several users of varying height, weight and experience as they finished floors using a mop-and-bucket method and the **ProSpeed**<sup>TM/MC</sup> applicator. The study was conducted to determine overall muscle effort and heart rate when using each system.



Using Electromyography (EMG), the muscular exertion of each participant was assessed in real time. The electrical impulses that initiate muscle contraction were measured by placing surface electrodes on the skin above the muscle groups being studied. The higher the voltage indicated by the electrode, the stronger the muscle contraction. Muscle groups studied included the trapezius, the neck and upper back; deltoid, cap of the shoulder; flexor capri radialis, flexor of the fingers and hand; and erector spinae, postural muscle of the lower back.

Researchers analyzed the average normalized effort of each muscle group throughout all stages of floor finish application including set up, application and clean up. The results showed that each muscle group consistently exerted more energy and effort when using the mop-and-bucket method compared to the **ProSpeed** applicator. Specifically, **ProSpeed** system users showed 36 percent less forearm flexor effort, 35 percent less deltoid effort, 23 percent less trapezius effort and 36 percent less erector spinae effort. This data revealed that the **ProSpeed** system resulted in less stress to the user.

The heart rate of each user was also monitored throughout each activity. The heart rate indicated the users' whole body effort when applying floor finish across a 2,500 square-foot area. To calculate the total impact, researchers multiplied the users' heart rate by the duration of the effort to reveal the total heart beat or cumulative body effort. This data shows that users of the **ProSpeed** system exerted 25% less overall effort compared to users of the mop-and-bucket system. During the non-value added steps of set-up and clean-up participants using **ProSpeed** showed less than half the total body effort compared to mop-and-bucket.

## Best Practices for Applying Floor Finish

To develop a comprehensive floor care program that enhances productivity and reduces labor, cleaning professionals should look for floor finish application methods that reduce heavy lifting and worker strain. In addition, the number of tools required to finish floors should be limited so labor is not wasted if tools are left behind.

When deciding upon the proper applicator system, select an application method that can be used by operators of varying heights and levels of experience.

Prior to using the system, workers should be properly trained on proper ways to finish floors to reduce stress on the body. For example, if the chosen floor finish application method involves a mop and bucket, workers should be educated on the dangers of lifting with the back as opposed to using their legs. Workers who acknowledge extended soreness or injury should be immediately treated to reduce the opportunity of permanent injury.

More cleaning professionals who want to improve cleanliness and reduce costs are turning to ergonomic tools and equipment. With the largest percentage of a department's budget dedicated to labor expenses, the value of enhanced worker safety programs is paramount. Using ergonomic tools not only helps reduce costs associated with absenteeism, training and on-the-job-injuries, it also helps boost worker productivity and morale. Ergonomics is an investment with an immediate return.

### Additional Ergonomic Resources:

Occupational Safety and Health Administration  
[www.osha.gov](http://www.osha.gov)

Cornell Human Factors & Research Group  
<http://ergo.human.cornell.edu>

The National Institute for Occupational Safety and Health  
<http://www.cdc.gov/niosh>

Ergonomics in Healthcare  
[www.ergonomicsinhealthcare.org](http://www.ergonomicsinhealthcare.org)

## Southeast Missouri Hospital Reclaims Time, Labor and Waste with ProSpeed™/MC Floor Finish Applicator System

### The Challenge: A Complicated and Labor-Intensive System

While innovations such as microfiber have improved the way many hospitals are cleaned and maintained, there are still cleaning processes that require an excessive amount of tools, labor and product. Floor finishing is one such area.

Many healthcare facilities finish floors using a traditional mop-and-bucket system, including Southeast Missouri Hospital (SMH) in Cape Girardeau, MO. SMH has multiple off-campus out buildings, requiring cleaning staff to carry tools from the utility closet to the building where floors are being finished.

“There are a lot of tools for workers to carry when finishing floors with the mop-and-bucket method,” said Debbie Goodhart, environmental service director for SMH. “It requires multiple components, including buckets, trash bags, bucket liners, mop sticks, mop heads and floor finish. If one or more of these products are forgotten, workers will have to make multiple trips which results in lost labor.”

In addition, carrying buckets filled with chemical can result in worker strain.

“If buckets were carried long distances or for extended periods of time, workers might complain of back aches and other related pains,” Goodhart said. “In addition, the motion of repeatedly swinging a heavy

mop saturated with finish across the floor surface might also cause strain on the workers.”

While preparing and finishing floors requires an extensive amount of time, labor and product, cleaning up after the process can be equally tedious and time consuming.

“Clean up is the last thing most cleaners want to do after spending hours applying floor finish,” added Goodhart. “Properly disposing of excess finish, rinsing out mop heads and taking the materials for proper laundering can be just as labor intensive as the finishing process.”

### The Solution: A New Easy-to-Use System Improves Productivity, Decreases Costs

Recognizing that healthcare customers are looking for ways to save time, labor and waste, JohnsonDiversey recently introduced the ProSpeed™/MC system, a new floor finish applicator that features an ergonomic design, bag-in-box (BIB) finish delivery system, disposable applicator pads and connector tubes.

Testers at SMH liked the ProSpeed system’s simple design and disposable parts.

“We have two full-time floor finishers and approximately 19 part-time finishers,” Goodhart said. “While some employees are reluctant to trial anything new, users immediately saw the benefit of the ProSpeed system once they used it. Its ergonomic design makes it easy to move across the floor and suitable for cleaners of varying heights and levels of experience. In addition, it is only one device, so it eliminates the numerous components associated with the mop-and-bucket system.”

### The Results: The ProSpeed System Saves More than Just Chemicals

After SMH trialed the ProSpeed system, it purchased several applicators. After a few months of use, Goodhart noted several unexpected benefits from using the ProSpeed system. She notes that it helps staff finish floors more thoroughly and cost effectively with a reduced environmental impact. In addition, she noted that staff no longer complained of back aches associated with carrying heavy buckets or mop heads.

Noting that the ProSpeed system eliminates water required to rinse mop heads after use, Goodhart also sees additional environmental savings from the ProSpeed system. With its previous mop-and-bucket system, SMH would add an additional load of laundry every other day to launder mop heads. After using the ProSpeed system, Goodhart estimates saving more than 800 gallons of water, six ounces of detergent, one labor hour and utility costs each week.

*Lance Brown is an Innovation Leader at JohnsonDiversey, Inc. in Sturtevant, Wisconsin. He has worked in the commercial chemical industry for more than 13 years gaining extensive experience in chemical formulation, tool design and application knowledge. He holds a Bachelor's degree in Chemistry from the University of Wisconsin-Parkside and a MBA from Loyola University Chicago.*

For more information, visit:  
[www.johnsondiversey.com/prospeed](http://www.johnsondiversey.com/prospeed).

