

PWC SAN DIEGO'S TERMINATOR PREVENTS WORK-RELATED INJURIES

Maintenance workers at Public Works Center (PWC) San Diego remove old and worn tile and carpeting that had been glued down to floors in offices, corridors, and other locations throughout the command's buildings. It used to take two workers approximately 160 hours, or about two man-weeks, to remove tile or carpet from a large office or work bay. The task required that the maintenance workers spend long periods of time kneeling on hard surfaces, pushing and pulling rolls of carpet and stacks of tile while manually pulling up old carpet or removing glued down tile using scrapers. After removing the old tile or carpeting, they also had to manually scrape up glue and mastic residues from the floor while kneeling.



Manual removal of carpet in a large space took two workers 160 hours.

Awkward motions and postures, such as extended reaching and prolonged kneeling, can lead to fatigue and discomfort of the arms, shoulders, back, and



Prolonged kneeling can lead to fatigue and discomfort of the arms, shoulders, back, and legs.

legs. Frequent, repeated, or lengthy exposures to such risk factors may not allow adequate time for the rest and recovery of fatigued muscles. When that happens, a worker may develop a *Work-Related Musculoskeletal Disorder*, or WMSD, the designation for a group of disabilities that usually involves weakness and discomfort. The discomfort due to a WMSD often improves following medical treatment and changing work habits in order to discontinue the activities that led to the symptoms. Symptoms reported by PWC San Diego workers who regularly removed old tile and carpet were back,

knee, shoulder, and wrist pain. They were examined and diagnosed by the base Occupational Health Clinic as well as by the employees' private physicians.

The difficulties described above were identified by the employees via the ergonomic training provided to PWC San Diego by their Safety Office. The

symptoms were found by the Navy's Occupational Health Clinic and Safety Office to possibly be related to the ergonomic risk of WMSDs for carpet and tile installation crews at PWC San Diego.

Ergonomics is the science of adapting the work task to the worker, instead of requiring the worker to adapt to existing work conditions. Tasks, equipment, and tools that are designed with the user and task in mind help to reduce the risk of WMSDs and other work-related injuries by allowing the worker to avoid harmful repetitive motions, awkward or unnatural postures, and repeated forceful pressure on susceptible parts of the body. Applying ergonomic principles in the workplace also increases productivity and efficiency, reduces errors and waste,



PWC San Diego's Ergonomics Program Manager approved purchase of the *Terminator*, a tile and carpet removal machine.



Derek VanVranken, Flooring Technician and *Terminator* operator, sits in a position that allows visibility of work being done by the blade.

increases worker satisfaction and workplace morale, and ultimately improves overall quality of work and the work product. The goal of the Navy's *Ergonomics Program* is to reduce the frequency and severity of WMSDs by redesigning work tasks or workstations through the introduction of procedures and tools that minimize ergonomic risk factors.

To resolve the problem of ergonomic risks associated with tile and carpet removal at PWC San Diego, work crews, their supervisor, and the business line Product Line Manager explored their options. After testing various possible solutions, they decided that using a machine called the *Terminator* to remove old carpet and tile would best suit their needs. The cost of the machine and the pay back, or *return on investment*, was discussed with the Ergonomics Program Manager, who granted authorization to purchase one *Terminator*. The funding for the purchase came from the PWC San Diego's budget for ergonomic solutions.

The *Terminator* is a machine designed for the removal of carpet, vinyl flooring, ceramics, porcelains, hardwoods, elastomerics (thermally conductive films), epoxies (strong glues), decorative coatings, roofing material, and sport surface coatings. It operates by mechanically scraping the old materials from the

flooring beneath them. The machine eliminates the need for extensive hand scraping and clean up of glues and mastics. The *Terminator* employs a rechargeable battery-powered water-cooled engine that is suitable for use in large indoor areas. The *Terminator* provides typical production 10 to 20 times faster than a manual method and greatly reduces the risk of WMSDs and other injuries.

A carpet in a large administrative office space at PWC San Diego was selected as the test area for the *Terminator* because of its size. The conventional carpet pulling method would ordinarily have taken two maintenance workers about 160 hours to complete. Using the *Terminator*, the task took one employee about 24 man-hours, representing a savings to PWC San Diego of \$9,670.00 in labor.

Workers who operate the *Terminator* are very satisfied with its performance. They consider the *Terminator* easy to operate; it allows them to complete more work in less time than they could ever accomplish by manually removing tile and carpet. The *Terminator* also does a much more efficient job of scraping than could be accomplished manually. All of this translates into a marked reduction in risk for WMSDs previously associated with prolonged kneeling, pushing, pulling and scraping. PWC San Diego has had no complaints of discomfort of the arms, shoulders, back, and legs and no reports of injuries associated with using the *Terminator*.



The battery-powered *Terminator* is recharged overnight, which allows well over eight hours of use, a normal work shift at PWC San Diego.