Safety & the Silver Collar Worker

Are older workers considered in program development?

By Michael E. Findley and James O. Bennett

THE EMERGENCE OF THE "SILVER COLLAR" worker as a major force in the U.S. labor market calls for the redesign of safety programs to address the special needs of the older worker. The popular focus of accident prevention programs on injury frequency fails to address the workforce in the new millennium. The aging of baby boomers, reduced birth rates during the 1960s and 1970s, and postponement of retirement has transformed the country's labor force (Mitchell 27). Prevention of on-the-job injuries must account for the higher costs of injuries suffered by older workers (Root 32) while still managing the more-frequent injuries characteristic of younger workers (Van Helst 315).

In August 1997, British Nuclear Fuels Limited Inc. (BNFL) received a six-year contract from the Dept. of Energy to decontaminate and decommission (D&D) the materials and equipment within the K-33, K-31 and K-29 gaseous diffusion plant buildings at the former K-25 site in Oak Ridge, TN. The three buildings comprise 4.8 million square feet and house more than 328 million pounds of material. Work involves heavy-construction-type dismantlement and removal operations of process equipment and support materials, and waste removal and disposal. The project utilizes a sophisticated D&D workshop and the largest supercompactor in the nuclear industry.

Since 2000, the project has maintained a recordable injury rate of less than 3.0 and achieved more than one million workhours without a lost-time accident in May 2001. In an effort to further enhance this safety record, work-related injuries were analyzed. The wide range of ages among workers had been identified as a potentially important factor in accident prevention and case management strategies. Therefore, the primary objective of this retrospective study was to evaluate the relationship between age and the frequency and severity of workplace injuries. The secondary objective was to determine the impact of this relationship on the design of accident prevention and risk management programs.

Are Older Workers Really More Frail?

Workers age 45 to 64 are expected to lead all other age groups in rapid growth between 1992 and 2005 (Fullerton 31). By 2005, 40 percent of the U.S. labor force will be 45 years or older (Fullerton 32). This increase comes at the same time that the proportion of workers age 25 to 34 is expected to decrease by five percent (Fullerton 33).

Popular myths about older workers must be challenged in order to design effective accident prevention programs. These workers are often portrayed as frail and unwilling to change, learn new skills or be competitive. However, chronological age poorly forecasts a worker's physical and mental ability. Older workers score high on job skills, loyalty, reliability, absenteeism and turnover, and demonstrate capability to change and adjust (Greller and Stroh 235). These characteristics call for a new approach to accident prevention and

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Photo 1 (above): The BNFL project involves decontaminating and decommissioning the materials and equipment within the K-33 (shown above), K-31 and K-29 gaseous diffusion plant buildings at the former K-25 site in Oak Ridge, TN.

Photo 2: Work involves heavy-construction-type dismantlement and removal operations of process equipment and support materials, and waste removal and disposal.

injury care that addresses their greater experience and superior skills as well as their slower recovery from trauma (Root 32).

The fact that many older workers are delaying retirement is another consideration. The Senior Citizens' Freedom to Work Act in 2000 now permits those age 65 to 69 to work full-time and still receive full Social Security benefits. This tax break, combined with low unemployment rates, a strong economy and baby boomers' rejection of the stereotypical "disabled" older person label, has changed the retirement picture. Many now put off retirement or return to work after retirement Price 244). Coupled with the slow growth of the 25-to-34 age group, competition for the older worker becomes a major strategy of the new economy (Vann).

Despite the increased desire to delay retirement, forced retirement due to workplace and social pressures remains a fact of life for older Americans (Price 244). Many employers still believe the antiquated notion that older people lack the strength to perform arduous work. zWhile physical strength and endurance decrease with age, characterization of older workers as weak is simply inaccurate. In most cases, older workers compensate for decreasing physical strength by working smarter and being more safety conscious (Ringenbach and Jacobs 174).

The ability and willingness to perform arduous work at a heavy pace correlates with factors other than chronological age. For example, a study of coal miners found that willingness to perform coal face work related to the ability to cope with the heavy pace and organizational pressures as well as the physical demands of the work (Powell 45). Powell also reported an occupational self-selection affecting both young workers and older employees. Serious decline in the physiological level as people age affects only a few, while personality traits such as "work ethic" remain relatively constant over time. Among the older population in particular continued work may be important for a sense of self-worth and personal identity (Greller and Stroh 234).

Good health, regardless of age, remains a major factor in entry into the workforce. Better mortality rates among the working population compared to the general population has been termed the "healthy worker effect" (McMichael, et al 128). Workers under age 25 have significantly higher injury rates coupled with socioeconomic pressures that place them at greater risk of serious and career-ending injuries (Mueller, et al 131). Once past the greater risk of this age group, age shows little relation to the healthy worker effect measured by relative risk (Monson 431).

Injury rates correlate with age, not experience. In a study of 1,300 workers at a copper plant, Van Helst (315) noted that accident rates declined over the first five months of employment. When Van Helst controlled for experience, age had a greater impact on injury rates than experience. According to this study, younger workers, regardless of experience level, were more likely to be injured; experience was found to be only important in the first few months of employment. Mueller (129) also found that length of service did not determine injury rates when age is controlled.

Data show that younger workers are more likely to be injured than older workers. Analysis of more than one million workers' compensation (WC) records revealed that the frequency of occupational injuries declines over time—up to age 64—then drops even more significantly (Root 31). In a review of 628 claims for press-related amputations, risk of amputation correlated with age, with younger workers found to be at greatest risk (Jensen and Sinkule 125). Rigenbach and Jacobs (173) found a positive correlation between age and safety orientation that related to fewer injuries among older workers.

While older workers may experience fewer injuries, those they do suffer are often more severe. Root's (32) review of the Bureau of Labor Statistics' supplementary data system revealed that older workers experienced more severe and disabling injuries and fatalities; consequently, average WC costs per claim increased with age. Cooke and

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Blumenstock's (119) study of sawmill workers reported that both younger and older workers suffered more-serious injuries, with the lowest injury severity at age 46. In a study of 136,000 work-related injuries to workers age 55 and older, injuries to workers 65 years and older were more likely to result in fractures or hospitalization (Layne and Landen 857). A construction contractor working at Tennessee Valley Authority power plants reported that 64 percent of injury claims involve workers over 40; these claims accounted for more than 76 percent of compensation costs (Day and Zimmerman NPS).

Older workers are more likely to sustain fractures and dislocations from falls on the same level than younger workers (Layne and Landen 861), while cuts, lacerations and burns occur more frequently among younger workers (Root 33). Although falls have been extensively examined among the community-based elderly (Perry 367; Northridge, et al 509; Campbell, et al 112; Nevitt, et al 167; and Dunn, et al 395), little research has been devoted to falls among the healthy elderly (Gabell 965).

The over-65 age group has the highest mortality rate due to injuries at home and in public places—and the single largest cause is falls (Perry 370). Mortality rate increases with multiple falls (Dunn, et al 397), while injury risk increases with neuromuscular and cognitive impairment (Cummings and Nevit 107). One study found that elderly males' risk of falls correlated with decreased activity, stroke and arthritis of the knees, while falls among elderly women were associated with medication and reduced muscle strength (Campbell, et a1 117).

As one might suspect, the frail elderly experience more falls than the vigorous elderly (Northridge, et al 513). In addition, the etiological factors for falls differ among these two groups, with environment playing a greater role in falls for the working elderly (Northridge, et al 513; Gabell 974). Falls at work resulting in hospitalization most often occurred when the victim was carrying objects while walking on stairs or steps. Handrail availability, impaired vision and improper lighting contribute to the risk of falls on stairways and steps, with excessive brightness or glare from sunlight found to be a greater factor than low levels of evenly distributed light (Templar, et al 195). Furthermore, Jacob and Cohen (156) observed that dimensional inconsistency in the stairway is more causal than the fitness of the individual or external variables such as wet or slippery surfaces. Inability to discern these dimensional inconsistencies coupled with impairments in gait and balance account for the increased number of falls on stairs and steps among the elderly worker.

Walking surfaces contribute to the increased level of falls on the same level among older workers as well. Contamination of the walking surface has been linked to 56 percent of falls on the same level (Proctor and Coleman 269); reduction in coefficient of friction is another factor (Leclercq, et al 206). Layne and Landen (858) reported that wet, waxed and greasy floor surfaces were present in one fourth of all falls to the same level even when "slip resistant" flooring was present; tripping over or entanglement in objects was responsible for 21 percent of fall injuries, with more than five percent attributed to cords and phone lines.

The highest injury rates for older workers occur in agriculture/forestry/fishing (Layne and Landen 857). The larger numbers of workers employed and the increased levels of exposure due to longer workdays on a farm contribute to these rates (Brisson and Pickett 585; Pratt, et al 637). Brisson and Pickett (585) also reported that a large percentage of farm injuries were acute and, thus, more likely to be treated in an emergency room.

Table 1

Work-Related Injuries by Age

Age	Employee	First aid	Recordable	Total	TIR
<29	159	55	15	70	44.0
30-39	209	37	17	54	25.8
40-49	178	40	11	51	28.7
50+	154	27	12	39	25.3
All	700	159	55	214	30.6

Table 2

Average Workers' Compensation Cost Per Employee, by Age

Age	Employees	Claims	Cost	Avg. cost per employee
<29	159	5	$5,531	$35
30-39	209	7	$62,979	$301
40-49	178	4	$100,812	$566
50+	154	6	$122,597	$796
All	700	22	$291,919	$417.00

The Study Method

This retrospective study, undertaken at a nuclear D&D project, examined the relationship between age, injury frequency and injury severity. The study population consisted of workers from 17 different labor organizations. The sampling frame included 700 workers employed in 1999 and 2000. Approximately 500 (71 percent) were craft workers; some 250 (50 percent) of whom were laborers. The remaining

crafts included boilermakers, operating engineers, pipefitters, ironworkers, painters, sprinkler fitters, electricians, sheet metal workers and teamsters. The remaining 200 employees were managers, supervisors and technical support staff.

A review of project records provided information on age, injury frequency and the cost of WC claims. Population demographics were obtained from the human resources employee database. The site's OSHA 200 injury/illness logs for 1999 and 2000, and first-aid log were used to identify injuries and illnesses that occurred during the study period. Injury cost was based on the total accrued WC costs.

Total injury rates and average claim costs were computed by age group. The total injury rate (TIR) per 100 employees was calculated by dividing total injuries for the two-year period by the number of employees in an age group, then multiplying by 100.

TIR = ((First-aid cases + recordable cases)/ employee number) x 100

Average injury cost per employee was calculated by dividing the sum of all accrued compensation costs for the two-year period in an age group by the number of employees in an age group.

Average injury cost per employee = Sum of all compensation costs/number employees in a group

The nonparametric chi-square test was employed to compare injury rates and average injury cost per employee to the various age categories (Gay and Airasain 502). This test was conducted based on the assumption that each age group would be expected to experience similar injury rates and WC claims costs.

Study Results

The total number of employees and distribution of employees by age group remained relatively constant from 1999 through 2000. It was assumed that the demographics on Dec. 31, 2000, accurately characterized the employee population. Of the 700 employees in the study population, 154 (22 percent) were age 50 or older. Another 387 (55 percent) were age 30 to 49, while 159 (23 percent) were age 29 and younger.

The project recorded 214 work-related injuries or illnesses from 1999 through 2000. These cases included 159 first-aid cases and 55 OSHA recordable injuries/illnesses. Table 1 presents the frequency of injuries/illnesses by age group, gender and injury classification. Table 1 also shows the TIR per 100 employees. Those age

Health & Safety Needs of Older Workers

In April 2001, the Div. of Behavioral and Social Sciences and Education within the National Academy of Sciences formed a Committee on Health and Safety Needs of Older Workers. As part of the project's scope, the group is working to:

- define and understand the size, composition and other dimensions of the older adult workforce over the next 20 to 30 years, including the changing nature of work and its implications for workers over the age of 50;
- identify the range of policy and research issues that should be addressed over the coming decade regarding the safety and health of older workers, including the effects, if any, of inappropriate working conditions on working capabilities and occupational injuries and the effects of longer working lifetimes on health;
- identify relationships between retirement patterns and these characteristics of the older workforce and of their jobs.

The committee will prepare a consensus report of its findings, conclusions and recommendations; this report is expected to be issued in the summer of 2003.

The Dept. of Health and Human Services, National Institute for Occupational Safety and Health/National Institute on Aging, and the Archstone Foundation are the sponsors for the committee.

For more information, visit www4.nas.edu.

Table 3

TIR by Age

Age	Observed	Expected	Residual
<29	44	30.6	13.4
30-39	25.8	30.6	-4.8
40-49	28.7	30.6	-1.9
50+	25.3	30.6	-5.3
All	30.6		

chi-square = 7.659 dF = 3 Sig>0.10

The average TIR for all age groups was 30.6. On this project, average WC costs per employee increased with age. As Tables 2 and 4 show, employees age 29 and younger had the lowest average cost per employee at $35, while those age 50 and older had the highest average cost per employee at $796. Researchers found a difference at the 0.001 significance level in the average claim cost per employee by age.

Table 4

Average Workers' Compensation Cost Per Employee, by Age

Age	Observed	Expected	Residual
<29	35	417	-382
30-39	301	417	-116
40-49	566	417	149
50+	796	417	379
All	417		

chi-square = 799.91 dF = 3 Sig>0.001

"Silver collar" workers will play an increasingly important role in the labor force, and employers must take advantage of their experience and their capabilities.

29 and younger had the highest TIR at 44.0. The 50+ age group had the lowest TIR at 25.3. TIR for those age 30 to 39 and 40 to 49 were 25.8 and 28.7, respectively. The average TIR for all age groups was 30.6. Injury rates differed at the 0.10 significance level by age group (Table 3).

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Discussion

Work-related injuries and WC cost per employee varied by age in this study. The 29-and-younger age group experienced higher injury rates than workers age 30 and older. Injury rates remained relatively stable once employees passed 29 years of age. The average cost per employee increased with age, with those age 29 and younger having the lowest average claim costs; employees age 50 and older had the highest average claim costs.

These results suggest that accident prevention programs must adapt a multifaceted approach in order to properly manage workplace risks, treat work-related injuries and control injury claims costs. As the workforce continues to age, the traditional focus on unsafe behaviors and injury frequency may contribute to ineffective management of unsafe environments and ergonomic hazards known to significantly impact the older worker. Treatment of injuries by on-site personnel trained in first aid and/or at emergency rooms may adequately address acute injuries characteristic of younger workers, yet may fall short in addressing long-term treatment needs of injured older workers.

The higher average cost per injury claim for older workers can no longer be managed by layoff or forced retirement. "Silver collar" workers will play an increasingly important role in the labor force, and employers must take full advantage of their experience and capabilities. Proper design, construction and facility maintenance with the older worker in mind; reduction of ergonomic hazards through job task hazard analysis and control; and quality care and follow-up of injuries are critical to effectively managing the aging workforce in the new millennium. ■

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