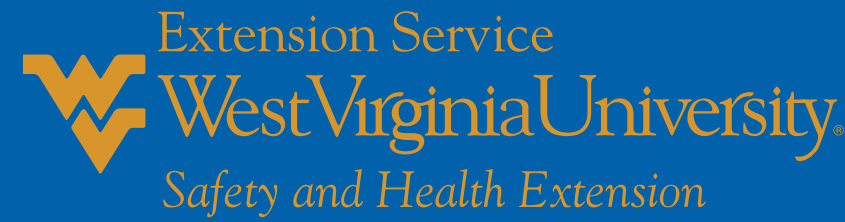


REVIEW OF RESEARCH ON DISABILITY IN CONSTRUCTION

Paul Becker, ScD, Clare Kennedy DiSalvo, BA, Gordon Burns, LLB/BA
Safety and Health Extension, West Virginia University Extension Service



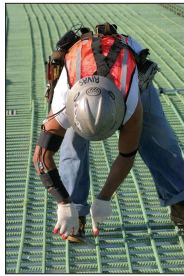
"of 500 small builders . . . only 9% of the 500 interviewees were older than age 55. The most plausible interpretation, and one backed up by anecdotal evidence, is that by age 55 builders were worn out, exhausted or restricted by chronic injuries . . . the industry is certainly marked by premature burn-out and early retirement."
—Mayhew 1997, p 198–99

METHODS

This poster reviews recent articles in the occupational health and safety literature that document and describe disability experience among construction workers. A literature search was conducted using the following search engines:

- GoogleScholar
- WVU Libraries Search
- PubMed
- Cumulative Index to Nursing and Allied Health Literature
- Ageline
- OSH-ROM

Searches were conducted on the terms "construction worker(s)", OR "construction industry" AND "disability" OR "early retirement" OR "aging."
This search yielded 60 articles in English.



STUDIES

Table 1, Studies of Disability Among Construction Workers, contains the ten articles based on original research to describe disability among construction workers. For purposes of this poster, the definition of disability includes government-issued disability pension, government-issued early retirement pension due to disability, occupational mobility caused by disability, impaired work ability, and impaired general functions.

Table 2, Related Studies, includes and describes 7 related studies that either examined disability among the general population or were not original studies, but were deemed significant contributions to understanding disability among construction workers. These did not address disability among construction workers specifically or were based on secondary sources.

Bar graphs depict the factors identified as leading to construction worker disability (Figure 1) and the common diagnoses leading to disability (Figure 2).

Figure 3 depicts the disability focus of the articles (compensated or non-compensated).

SOURCES OF DATA

Studies included prospective and retrospective studies with populations ranging from 20 to 389,000. Mean population for these studies (n=16) is 30,767. Primary sources of data included:

- Questionnaires
- Health Examinations
- Examination Records
- Benefit Systems Records
- Focus Groups



"When compared to the blue collar reference group, the differences in disability risk were . . . statistically significant for all causes combined (SIR = 1.11), musculoskeletal diseases (SIR = 1.53), in particular arthropathies (SIR = 1.87) and dorsopathies (SIR = 1.25), and accidents (SIR = 1.81)."
—Arndt 2005, p 561

Table 1. Studies of Disability Among Construction Workers.

Date	Author	Title	N	Sample	Data Sources	Methods	Outcome Measured	Results: Risk Factors for Disability	Results: Disability Characteristics
2007	Alavina et al.	Influence of work-related factors and individual characteristics on work ability among Dutch construction workers	19,507	Dutch construction workers (male) who had a voluntary occupational health examination in 2005	Questionnaires, health examinations	Statistical analysis	Work ability	■ Work-related factors, including physical workload, had a greater influence on work ability variability than individual characteristics. ■ Physical workload and, to a lesser extent, psychosocial factors at work together explained 22% of the variability in work ability. Age, leisure time physical activity, lung obstruction, and cardiovascular risk profile explained about 10% of the workers' ability to work, but, when adjusted for work-related risk factors, their effects became very small. ■ "Awkward back posture, static work postures, repetitive movements, and a lack of support at work had the highest influence on work ability."	
2005	Arndt et al.	Construction work and risk of occupational disability: a ten year follow-up of 14,474 workers	14,474	German construction workers (male, ages 25-64) who participated in standardized routine occupational health examinations between 1986-1992	Records	Statistical analysis	Disability pension	■ Construction workers not only experience a higher risk of all-cause disability than the general workforce but also experience a higher risk of disability than blue collar workers in general. ■ Construction workers' relative increase in disability risk increases with age and with longer duration of employment . . . indicating that older and experienced construction workers seem to be at particular risk of occupational disability.	■ Musculoskeletal disorders (45%) and cardiovascular diseases (19%) were the top causes of disability among construction workers. ■ The increased rate of disability for construction workers (compared to other blue collar workers), however, is mainly caused by musculoskeletal disorders and accidents.
1996	Arndt et al.	Older workers in the construction industry: results of a routine health examination and a five year follow up	4,958	German construction workers (male, ages 40-64) who had occupational health examinations in 1966-8	Records, active follow up study	Statistical analysis	Health status and early retirement	■ "Compared to the white collar workers, a higher prevalence of hearing deficiencies, signs of obstructive lung diseases, increased body mass index, and musculoskeletal abnormalities were found among the construction workers at the baseline exam." ■ "Compared with white collar workers, the construction workers showed a 3-5 to 8-4-fold increased rate of disability." ■ Unskilled workers, plasterers, bricklayers, and carpenters were found to have the highest risk of disability.	
2000	Brenner and Ahern	Sickness absence and early retirement on health grounds in the construction industry in Ireland	3,098*	Irish construction workers who were members of the Construction Federation operatives pension and sick pay scheme between 1972 and 1996* <i>early retirement portion of study</i>	Records	Statistical analysis	Disability leading to early retirement*		■ Cardiovascular disease (31%) and musculoskeletal disorders (30%) were found to be the major diagnoses leading to permanent disability.
1982	Damlund et al.	Low-back pain and early retirement among Danish semiskilled construction workers	367	Danish semiskilled construction and warehouse union workers who chose to retire on an early pension (voluntary, not based on medical criteria) between Jan 1, 1979 and April 31, 1980	Questionnaires	Statistical analysis	Early retirement		■ "Relatively more of the retired semi-skilled construction workers than the reference group reported low-back pain as one of the reasons for early retirement" (40% vs. 25%). ■ Construction workers with more years of experience were found to have more severe back pain.
2006	LeMasters et al.	Functional impairment and quality of life in retired workers of the construction trades	251	Retired Ohio workers from both construction and non-construction fields	Focus groups, questionnaires	Qualitative and statistical analysis	Functional impairment and quality of life among retirees	■ Retired construction workers were almost five times more likely than retirees from other fields to report their health as being fair or poor. ■ Almost one in five (19%) of the retired construction workers said that they had severe to very severe pain compared to 3% of the retirees from other fields.	■ Compared to retirees from other fields, "construction retirees reported significantly greater problems with their vision, neck and shoulders, hands and wrists, hips, knees, and ankle/feet joints."
2000	Liira et al.	Work ability of middle-aged Finnish construction workers—a follow-up study in 1991-1995	961	Finnish construction workers (ages 40 and over)	Interviews, government records	Statistical analysis	Work ability	■ "The work ability index was highly predictive of disability pensions." ■ Work ability decreased with age, especially after 50 years.	
2001	Siebert et al.	Demonstration of the healthy worker survivor effect in a cohort of workers in the construction industry	10,809	German construction workers (male, ages 15-64) who had occupational health examinations in 1966-8 and were followed up for the time period 1986-1994	Records of previous study; follow-up (contacting employers and employees or relatives)	Statistical analysis	Occupational mobility and early retirement due to permanent disability	■ Disorders of the back and spine are "a common predictor of both occupational mobility and early retirement." Authors identify a "healthy worker survivor effect" related to these disorders, which means that disabled workers choose to change employers or retire early while healthy workers remain. ■ In total, there were about as many events of occupational changes as events of early retirement due to permanent disability significantly attributable to disorders of the back and spine.	
2005	Stattin and Jarvholm	Occupation, work environment, and disability pension: A prospective study of construction workers	389,000	Swedish construction workers who participated in health examinations between 1971 and 1992	Health examinations, questionnaires	Statistical analysis	Disability pension	■ The construction workers (by specific occupation) who experienced the highest age-adjusted rates of disability were "rock workers," "roofers" and "insulators," and "concrete workers." "Salaried workers" and "foremen" experienced the lowest disability rates. ■ Workers who reported a negative physical work environment "had an age-adjusted odds ratio almost three times as high as those with a good physical environment." ■ A relatively high proportion of construction workers aged 45 to 64 years (43.8%) reported back complaints, compared to 33.9% of senior workers in physically demanding fields in general.	■ In all construction occupations, the most common cause of disability was musculoskeletal disorders.
1999	de Zwart et al.	Senior workers in the Dutch construction industry: a search for age-related work and health issues	3,827	Dutch construction workers (all male, between 16 and 64, and from one region of the country) who completed a nationally administered occupational health survey between 1982 and 1993	Questionnaires and literature search	Statistical and qualitative analysis	Age-related work and health issues		

Table 2. Related Studies.

Date	Author	Title	N	Sample	Data Sources	Methods	Outcome Measured	Results: Risk Factors for Disability	Results: Disability Characteristics
2005	Burdorf et al.	Development of a decision model to identify workers at risk of long-term disability in the construction industry	N/A	N/A	Two cohort studies of construction workers and disability	Statistical analysis	Long-term disability	■ Looked at four risk factors for long-term disability: work ability, age, musculoskeletal complaints, and sickness absence. ■ Construction workers without any risk factor had a 0.02 risk for long-term disability within the next four years, whereas workers with all four factors had a 0.79 risk.	
2002	Hagen et al.	A prospective cohort study of risk factors for disability retirement because of back pain in the general working population	34,754	All employed Norwegians in a particular cohort between 25 and 59 years old in 1985	Questionnaires and records	Statistical analysis	Disability retirement because of back pain	■ "The subjects at highest risk for future back pain disability pension perceived their work as constantly demanding physically, had poor general health and mostly felt generally tired and worn out." ■ Workers who met all three of these criteria had an odds ratio of almost 25 to end up on disability pension for back pain compared to workers who met none of them.	
2000	Holte et al.	Manual work as predictor for disability pensioning with osteoarthritis among the employed in Norway 1971-1990	6,738	All Norwegians registered as 50-56 years old and employed in the 1970 or 1980 census who received a disability pension during the 10-year follow period	Records	Statistical analysis	Disability pension	■ Manual workers have nearly twice the probability of becoming a disability pensioner with osteoarthritis compared to professionals after adjusting for part-time work, income, level of education, marital status, and gender."	
2002	Karpansalo et al.	Physical workload and risk of early retirement: prospective population-based study among middle-aged men	1,755	Finnish men between 42 and 65 who were followed from 1984 to 2000	Pension records, questionnaires, and exercise tests	Statistical analysis	Disability and early retirement pension	■ "After adjusting for age, body mass index, alcohol consumption, smoking, maximal oxygen intake, education, and corresponding illness at baseline, heavy physical work was found to be associated with an increased risk of being retired on a disability pension due to musculoskeletal disorders." ■ "Lifting, static muscular loading and uncomfortable work positions increased the risk of early retirement especially due to musculoskeletal disorders."	■ The major causes of early retirement were musculoskeletal disorders (40%) and cardiovascular diseases (27%).
1997	Krause et al.	Predictors of disability retirement	1,038	Finnish men who participated in the Kuopio Ischemic Heart Disease Risk Factor Study and were 42, 48, 54, or 60 at the beginning of the study	Questionnaires and health examinations	Statistical analysis	Disability retirement	■ The following characteristics were found to predict disability retirement: heavy work, work in uncomfortable positions, long work hours, noise at work, physical job strain, musculoskeletal strain, repetitive or continuous muscle strain, mental job strain, and job dissatisfaction.	
1997	Mayhew et al.	Subcontracting and occupational health and safety in the residential building industry	708	Randomly selected Australian and British self-employed builders, building workers and health care providers	Surveys and studies of worker compensation claims and hospital treatments	Examinatory analysis	Relationship between builder subcontracting and OHS and injury causation	■ Length of time worked and over-exertion. "by age 55 builders were worn out, exhausted or restricted by chronic injuries" ■ Continued work on untreated prior injuries	
2000	Turner et al.	Predictors of chronic disability in injured workers: a systemic literature synthesis	20	Population-based or prospective cohort studies of predictors of work disability among workers with work-related injuries	MEDLINE search, personal file searches, and requests to experts	Literature review	Chronic or recurrent disability	■ "The most frequently identified predictors of prolonged disability were older age and greater baseline pain and functional disability." ■ Older workers consistently fared poorer than younger workers. ■ "Lumbar symptoms, smaller company size, and construction work were significant predictors in several, but not all, studies."	

Figure 1. Risk Factors for Disability.

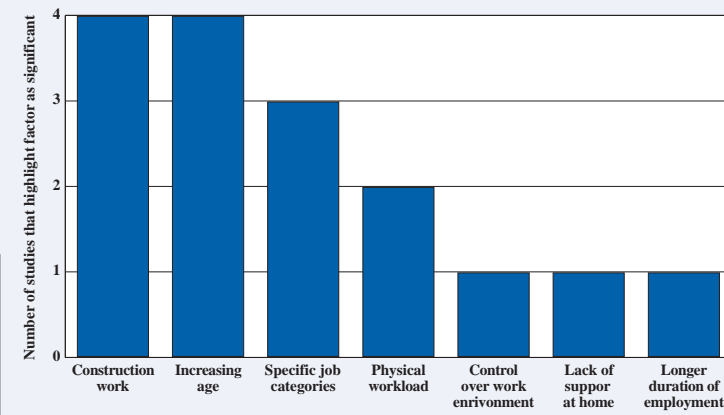


Figure 2. Most Common Diagnoses Leading to Disability.

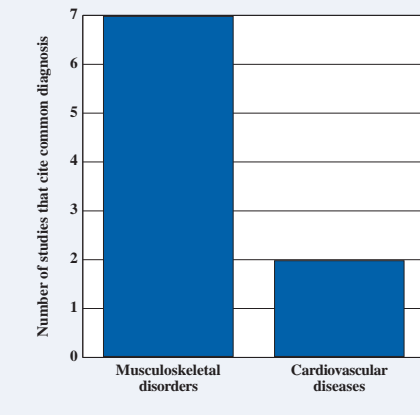
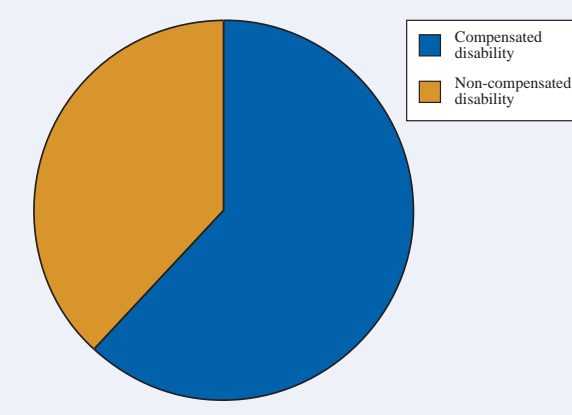


Figure 3. Focus of Studies (n = 8).



OUTCOMES

The studies consistently reported decreased work ability, high rates of disability and early retirement and job mobility when compared to a variety of white collar and other blue collar populations. The leading disability, retirement, and mobility characteristics were musculoskeletal disorders and cardiovascular disease. Several studies reported pain, particularly low back pain, as an important characteristic associated with construction worker disability and early retirement, and mobility. Retired construction workers were more likely than retirees from other fields to report that their health was fair or poor. Studies that identified risk factors for construction worker disability identified construction work (as opposed to other occupations), increasing age, specific job categories, physical demands of construction work, lack of support at work and longer duration of employment as risk factors. Studies noted two factors that were likely to lead to under reporting of the debilitating effect of the high demands on workers' health. These factors include a substantial healthy workers' effect and the difficulty of tracking workers who leave construction work due to non compensable factors such as pain and inability to meet job demands.



WORN OUT WORKER

As a body, these studies establish that construction workers experience a high rate of early retirement and disability, most likely associated with factors associated with a high level of physical demands. While the literature is full of articles that discuss older workers that cannot keep up with the high physical demands of the work, this body of literature on disability suggests an opposite hypothesis. This hypothesis would argue that the high physical demands of construction work accelerate the aging process among construction workers. Further research is needed to investigate this alternative hypothesis. Of particular interest would be the possible description of a population of early retired construction workers whose bodies are "worn out," yet who do not qualify for traditional disability pensions. The long term project suggested by this summary is to change the nature of construction work so that the reported high level of physical demands do not continue to produce the reported disabled population of workers.

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"Workers in the construction trades traditionally experience a lifetime of physically demanding job tasks that may cause cumulative degeneration of all physiological systems and injury."
—LeMasters, p 238

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