Independent contractor employment and accident trends in metal/nonmetal mining

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Within the Mine Safety and Health Administration's (MSHA's) classification of metal/nonmetal (M/NM) mining, the number of independent contractor[1] employees has increased significantly in recent years. In 1985 independent contractor employee hours reported to MSHA accounted for 4.5% of all M/NM mining employee hours (excluding office workers); by 1994 that proportion had doubled to 9.0%. As a result, these workers now account for an increasingly significant proportion of fatal and nonfatal mining accidents. According to MSHA's statistics, annually computed fatality incidence rates (the number of fatalities per 200,000 employee hours) for independent contractors working in M/NM mining are consistently higher than those for operator employees. Over the five-year period from 1990 through 1994, 53 independent contractor employees were fatally injured while working on M/NM mine property (See Table 1). More than one third of these fatalities (36%) were due to accidents involving powered haulage; 21% were machinery accidents; and 11% percent were falling material accidents. Combined, these three accident classifications accounted for 68% of all independent contractor fatalities occurring on M/NM mine property during these years. Clearly, current efforts to increase the safety of the mining workforce must also address the safety of the independent contractor employee.

This report is a preliminary attempt to identify trends in the employment and safety of independent contractor workers by identifying which segments of M/NM mining are experiencing the greatest increases in the number of independent contractor employees and by examining changes in the rates and types of accidents in which these employees are involved. The employment and accident data used in this report were obtained from the MSHA database.

Table 1.—Independent contractor metal/nonmetal fatalities, 1990-1994

Accident type	Number	Percent	Cumulative percent
Powered haulage	19	36	36
Machinery	11	21	57
Falling material	6	11	68
Slips/falls	6	11	79
Electrical	5	9	88
Explosives	3	6	94
Other	3	6	100
TOTAL	53	100	100

Independent contractor metal/nonmetal data

Independent contractors are required to report employee activity to MSHA separately for coal and metal/nonmetal mining. MSHA differentiates M/NM mining into four distinct segments based on the type of material being mined: (1) metal (e.g., iron ore, copper, gold, etc.), (2) nonmetal (e.g., salt, phosphate rock, clay), (3) stone (e.g., limestone, lime), and (4) sand and gravel. Sand and gravel mining is strictly a surface operation (including dredging), while metal, nonmetal, and stone mining may include underground mining, surface mining and mill operations. Independent contractor hours are reported for the particular type of operation for which the hours were worked (i.e., underground, surface area of underground, strip mine, mill, etc.), not by the type of material being mined or processed. However, for each independent contractor accident reported to MSHA, information is obtained regarding both the type of operation where the accident occurred as well as the type of material being mined or processed. This additional information makes it possible to determine what proportion of independent contractor accidents occurred at metal, nonmetal, stone, or sand and gravel mines or mills.

In the following sections, independent contractor employee hours, accidents and fatalities are reported within the four major mining locations which include underground locations, surface locations at underground mines, surface mining, and mills. Also reported are the proportion of accidents occurring at metal, nonmetal, stone, or sand and gravel operations. Overall, the data is presented as a comparison of employment and accidents for two time periods occurring at the

Table 2.—Number and proportion of employee-hours, accidents, and fatalities accounted for by independent contractors working in metal/nonmetal mining

Mining location	Years	Employee-hours		Accidents[1]		Fatalities	
		Number[2]	Percent of all hours	Number and *rate*[3]	Percent of accidents	Number and *rate*[3]	Percent of fatalities
Underground mines	1985-87	2.9	0.7	172 *11.68*	0.8	0 *0*	0
	1992-94	8.0	2.5	527 *13.11*	2.9	0 *0*	0
Surface area of underground mines	1985-87	7.3	13.3	78 *2.13*	5.1	4 *0.11*	18.2
	1992-94	16.1	34.4	161 *2.00*	12.3	5 *0.06*	55.6
Surface mines	1985-87	23.7	6.9	303 *2.56*	6.1	7 *0.06*	14.6
	1992-94	42.6	15.4	476 *2.23*	11.5	19 *0.09*	45.2
Preparation plants	1985-87	9.3	8.7	260 *5.60*	11.2	1 *0.02*	6.3
	1992-94	17.9	19.1	270 *3.02*	12.6	7 *0.08*	53.8

[1] *Accidents include injuries resulting in either permanent disabilities or lost workdays or both, but excludes injuries resulting only in days of restricted work activity.*
[2] *Employee-hours are reported in millions of hours.*
[3] *Rates (in italic) are computed as the number of accidents or fatalities per 200,000 employee-hours.*

beginning and the end of a ten-year span from 1985 to 1994. Because the number of incidents involving independent contractors in certain accident categories during any one year may be small, three-year totals are presented; the first three years (1985-87) of the ten-year period are compared with the last three years (1992-94).

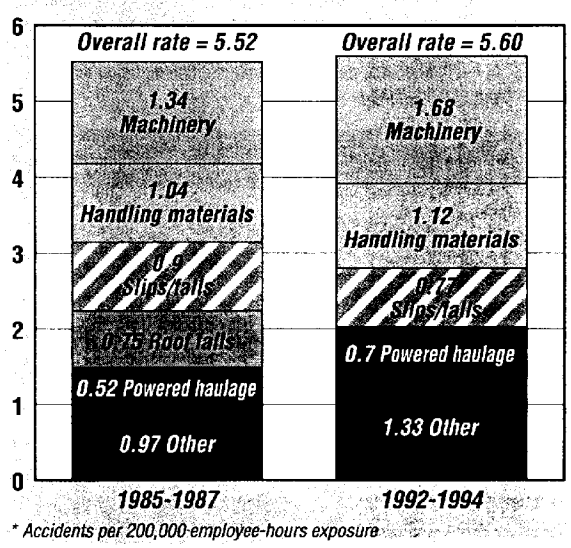
Underground locations of metal/nonmetal mines

In underground M/NM mining, independent contractor employee hours increased by only 7% (from 2.7 to 2.9 million hours) from 1985-87 to 1992-94 (See Table 2). These hours represented 3.7% of all underground M/NM mining employee hours in 1985-87 and most recently account for about 4.4% of all underground employee hours. Comparing these two time periods, independent contractor fatality rates have decreased significantly from .37 to .07 fatalities per 200,000 employee hours, while the lost day accident rate has increased slightly from 5.52 to 5.60.

Separate rates computed for the most frequently occurring accidents during both time periods (See Figure 1) show a rise in the rate of occurrence of machinery, handling materials, and powered haulage accidents. On the other hand, the rate of accidents due to slips and falls has decreased slightly, and the rate of occurrence of roof fall accidents has dropped to less than 0.5 (included in '*Other*').

Although the majority of independent contractor underground accidents occur at metal mines, recent increases in the number of accidents occurring at nonmetal and stone underground mines suggest these two industries are increasing their use of independent contractors. In the period including 1985 through 1987, 93% of independent contractor lost day accidents occurred at underground metal mines; the remaining 7% occurred

Figure 1.—Independent contractor lost-day accident rates at underground metal/nonmetal mines*



* Accidents per 200,000 employee-hours exposure

at nonmetal mines. More recently, 1992 through 1994, 78% of the lost day accidents occurred at metal underground mines (primarily copper, lead/zinc and gold); 18% at nonmetal underground mines (primarily salt); and 4% at stone mines (primarily limestone).

Surface locations of underground metal/ nonmetal mines

At surface locations of underground M/NM mines, employee hours of independent contractor workers increased by 53% from 1985-87 to 1992-94. These hours now account for 15.5% of the total number of hours reported for the surface areas of underground M/NM mines (See Table 2). Despite an increase of about one million employee hours during 1992-94, no fatalities occurred during this time period and the lost day accident rate decreased substantially from 3.91 (1985-87) to 2.96 (1992-94).

Contributing to this decrease in the accident rate were significant declines in the rates of accidents involving machinery, hand tools, and powered haulage (See Figure 2). The occurrence of accidents involving machinery and hand tools declined to rates of 0.21 and 0.28, respectively, during 1992-94 (included in '*Other*'). On the other hand, the rate of lost day accidents due to handling materials increased while the rate of occurrence of accidents due to slips and falls remained relatively unchanged.

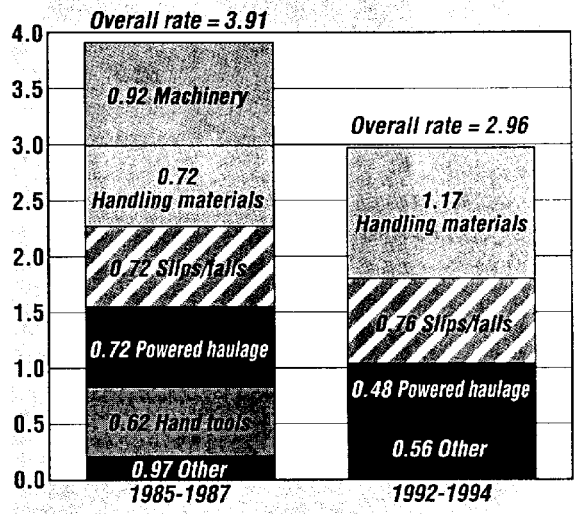
Although from 1985-87, 92% of the accidents occurred at metal underground mines, during 1992-94 only 47% occurred at metal mines, while 44% were reported at nonmetal mines, and 9% at stone mines.

Surface metal/nonmetal mines

Comparing the two time periods, employee hours of independent contractors working at surface M/NM mines have increased by about 75% over the past ten years. With an increase of 23 million employee hours, surface M/NM mining operations have experienced the greatest increase in the absolute number of independent contractor employees hours. The 53.4 million employee hours reported during 1992-94 accounts for 10% of all employee hours reported for surface M/NM mines (See Table 2). However, independent contractors also accounted for 29% of the fatalities (21 out of a total of 73) which occurred at surface M/NM mines during 1992-94. Eleven of these 21 fatalities occurred at stone mines, five at sand and gravel operations, three at metal mines and the remaining two fatalities occurred at nonmetal surface mines. Although the fatality rate for independent contractors has decreased from .13 (1985-87) to .08 (1992-94), it still exceeds the rate for direct employees of surface mine operators. On the other hand, independent contractors comprised only 6% of the accidents occurring at M/NM surface mines. Additionally, the overall lost day accident rate for independent contractors at surface mines has decreased from 2.13 (1985-87) to 1.87 (1992-94).

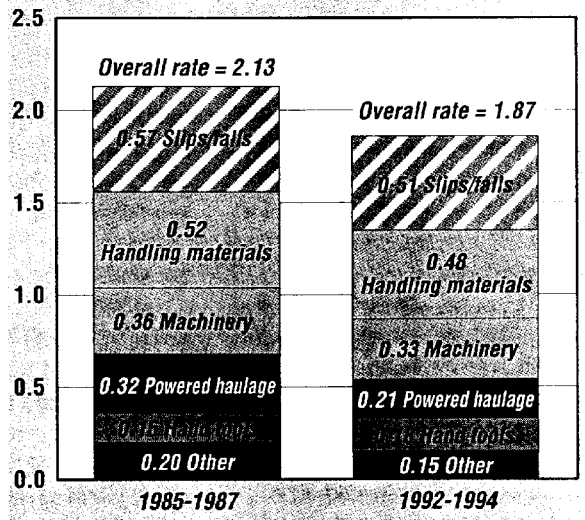
Separate rates computed for the five major types of accidents show a substantial decrease in the rate of powered haulage accidents and slight decreases for accidents due to

Figure 2.—Independent contractor lost-day accident rates* at surface locations of underground metal/nonmetal mines



* Accidents per 200,000 employee-hours exposure

Figure 3.—Independent contractor lost-day accident rates* at surface metal/nonmetal mines



* Accidents per 200,000 employee-hours exposure

slips and falls, handling materials, and machinery accidents (See Figure 3).

From 1992-94, only 6% of these independent contractor accidents occurred at sand and gravel operations and 8% at nonmetal (primarily phosphate rock) surface mines. Most of the accidents (59%) were reported at metal surface mines (primarily gold and copper mines) while about a fourth of the accidents (27%) occurred at stone mines (primarily limestone mines). The differences in proportions of accidents occurring within these four subgroups did not vary by more than 5% (plus or minus)from 1985-87 to 1992-94.

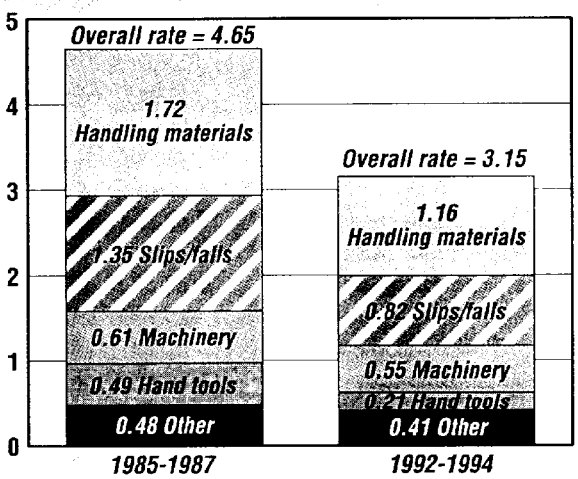
Metal/nonmetal mills

At metal, nonmetal and stone mills, employee hours for independent contractor workers increased by 74% from 1985-87 to 1992-94. With 26.8 million employee hours and 421 lost day accidents reported during 1992-94, independent contractors now account for 6% of all mill employee hours and 6.7% of the accidents (See Table 2). Of the 27 fatalities occurring at M/NM mill operations from 1992-94, 26% (seven of 27 fatalities) involved independent contractor employees. Despite the relatively high proportion of fatalities accounted for by independent contractor workers at mills, the fatality rate has decreased from .08 (1985-87) to .05 (1992-94). Similarly, although the overall accident rate for independent contract workers at mills is higher than the accident rate for direct employees of mills, a comparison of the two time periods shows a decrease from 4.65 during 1985-87 to 3.15 more recently.

This decrease in the overall lost day accident rate reflects declines in the rates of the major types of accidents particularly those due to handling materials, slips or falls, and the use of hand tools (See Figure 4).

From 1985 through 1987, 61% of independent contractor mill accidents occurred at metal mills; 32% at stone mills; and 7% at nonmetal mills. During 1992-94, 43% of independent contractor lost day accidents were reported at stone mills (primarily limestone and cement mills); 41% occurred at metal mills (primarily gold, copper, and alumina); and 15% at nonmetal mills (clay and phosphate rock).

Figure 4.—Independent contractor lost-day accident rates* at metal/nonmetal mills



* Accidents per 200,000 employee-hours exposure

Discussion

The number of independent contractor employee hours in metal/nonmetal mining reported to MSHA has increased by 70% (50.4 million hours to 85.9 million hours) when comparing the three-year period from 1985 to 1987 to the period from 1992 to 1994. The largest increases in the numbers of independent contractor employee hours are being reported at surface mines and mills. Fatality rates for independent contractors at both of these locations are higher than those observed for the direct employees of operators. However, improvement at both of these locations is evidenced by the fact that both the fatality and accident rates reported for independent contractors during the years 1992-94 are lower than those computed for the years 1985-87.

Independent contractor employees will continue to be a growing segment of the mining workforce. Specific accident and injury data provides safety practitioners with information that can be used in safety intervention strategies. For example, most independent contractor fatal accidents were classified as either powered haulage or machinery accidents. These may be accident classifications on which safety practitioners want to focus. To further enhance safety interventions, a more detailed profile of independent contractors working in M/NM mining is necessary. Additional areas of investigation might include the following: (1) an assessment of risk and exposure to hazards based on job classification and type of mine, and (2) conducting evaluations of the training provided to independent contractor workers.

[1] *Title 30 CFR, part 45, section 2c defines an independent contractor as: "any person, partnership, corporation,... that contracts to perform services or construction at a mine." Mine operators employ independent contractors for a variety of production and support services. A sample of occupations include truck drivers, security guards, supervisors, technicians, equipment operators, mechanics, drillers and blasters, and construction workers. Although independent contractors are required to report annual hours worked on mine property to MSHA, they are not required to obtain an MSHA identification number. Consequently, the possibility exists that the number of independent contractor employee-hours and accidents, while working on mine property, may be under reported.*