U.S. Department of Labor
Mine Safety and Health Administration

NATIONAL STONE, SAND & GRAVEL ASSOCIATION

Natural building blocks for quality of life

MSHA/ NSSGA ALLIANCE
Formed Feb. 11, 2003
MISSION:
Examine MSHA’s injury and illness database for the aggregate industry to identify what interventions will improve miner health and safety.

SCOPE (CY 2000-2002):
1) Identify where the most injuries or illnesses occurred by accident classification and type of activity
2) Examine the most severe injuries and illnesses in these classifications

A total of 12,147 injuries, including 67 fatalities and 129 permanent total or partial disabilities, were analyzed in 12 aggregate industry classifications, including crushed stone, sand and gravel, and shale.
CODE DEFINITIONS

Accident classification – circumstances that contributed most directly to accident; e.g., handling material or slip/fall of person

Accident type – event which directly resulted in the injury; e.g., overexertion

Activity – what the injured was doing at the time of the injury; e.g., machine maintenance/repair
TWO OF THE 21 ACCIDENT CLASSIFICATIONS ACCOUNTED FOR 57% OF THE ACCIDENTS (n = 7,337)

- Handling Material
- Slip/Fall of Person
Handling Materials Classification

- **Handling Materials**
  - 4,269 Injuries
  - 35% of Total
  - 0 Fatalities

- Total Injuries: 12,147

- **Handling Supplies/Materials Subcategory**
  - 1,852 Injuries
  - 43% of Total
  - 5 Disabilities

- **Machine M/R**
  - 1,363 Injuries
  - 32% of Total
  - 20 Disabilities

- **Hand Shoveling/Mucking**
  - 182 Injuries
  - 4% of Total
  - 5 Disabilities

- **Handling Coal/Rock Waste/Ore Subcategory**
  - 202 Injuries
  - 5% of Total
  - 4 Disabilities

- **Overexertion**
  - 1,942 Injuries
  - 45% of Total
  - 24 Disabilities

- **Handling Materials Classification**
  - Total Permanent Disabilities: 129

- **Total Permanent Disabilities**: 129
Handling Materials

- 4,269 injuries (35%)
- 0 fatalities
- 61 permanent disabilities (47%)

OVEREXERTION
- 1,942 (45%)
HANDLING MATERIALS (n = 4,269)

Activities resulting in the most injuries:

- Handling supplies/materials
  - 1,852 injuries (43%, 24 permanent disabilities)

- Machine maintenance & repair
  - 1,363 injuries (32%, 20 permanent disabilities)
Slips, Trips, and Falls Classification

- **Total Injuries**: 12,147
- **Total Fatalities**: 67

### Slips, Trips, Falls Category
- **Injuries**: 2,708
- **Fatalities**: 7
  - 22% of Total
  - 3 Disabilities

### Handling of Supplies/ Materials Subcategory
- **Injuries**: 276
- **Fatalities**: 0
  - 10% of Total

### Machine Maintenance & Repair Subcategory
- **Injuries**: 425
- **Fatalities**: 0
  - 16% of Total

### Walking/Running Subcategory
- **Injuries**: 664
- **Fatalities**: 0
  - 25% of Total

### Climbing On/Off Equipment Subcategory
- **Injuries**: 880
- **Fatalities**: 0
  - 32% of Total

### Total for All Categories
- **Injuries**: 2,708
- **Fatalities**: 3

3 Fatalities

- Handling of Supplies/ Materials Subcategory
- Machine Maintenance & Repair Subcategory
- Walking/Running Subcategory
- Climbing On/Off Equipment or Machines
- Slips, Trips, Falls Category
- Total for All Categories
SLIPS, TRIPS, AND FALLS (n = 2,708)

Activities resulting in most injuries:

- **Climbing on/ off equipment or machines**: 880 injuries (32%)
- **Walking/ running**: 664 injuries (25%)
- **Machine maintenance/ repair**: 425 injuries (16%)
- **Handling supplies/ materials**: 276 injuries (10%)

These activities accounted for 3 fatalities.
Six activities accounted for the most (76%) injuries:

- Machine Maintenance/Repair (20%)
- Handling Supplies/Materials (19%)
- Hand Tools (Not Powered) (12%)
- Climbing On/Off Equipment/Machines (9%)
- Walking/Running (7%)
- Operating Mobile Equipment (7%)
Total Injuries for CY 2000-2002
12,147

- All Other Activities: 2,965 (24%)
- Machine Maintenance And Repair: 2,466 (20%)
- Handling Supplies/Materials: 2,332 (19%)
- Hand Tools: 1,518 (12%)
- Climbing on/off Equipment/Machines: 1,142 (9%)
- Walking/Running: 866 (7%)
- Operating Mobile Equipment: 838 (7%)

Total Injuries for CY 2000:
- All Other Activities: 2,965
- Machine Maintenance And Repair: 2,466
- Handling Supplies/Materials: 2,332
- Hand Tools: 1,518
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Total Injuries for CY 2000-2002: 12,147
Combined Machine Maintenance/Repair with 10 Additional Activities

“Maintenance, Repair and Construction.”

5,078 injuries within this expanded category (42% of the total injuries reviewed), which consists of:

- Machine Maintenance/Repair
- Hand Tools (not powered)
- Surface Construction NEC
- Welding and Cutting Elect/Acetyl
- Hand Tools (powered)
- Moving Equipment (Fans/Pumps/etc.)
- Grinding Bits/Steel/Welds
- Electrical Maintenance/Repair
- Operate Hoist
- Working with Chemicals
- Working with Noxious Materials
Maintenance, Repair, & Construction Classification

Total Injuries
12,147

MRC Injuries
5,078
Maintenance, Repair and Construction
(5,078 injuries)

- 2,146 arm and/or hand
- 523 eye
- 487 back
- 394 overexertion
Maintenance, Repair, & Construction Injuries - Breakdown

5,078 Injuries

- Fingers, Hand, Wrist, or Arm: 2,146 (42%)
- All Other: 1,922 (38%)
- Eye: 523 (10%)
- Back from Overexertion: 394 (8%)
- Other Back: 93 (2%)
Maintenance, Repair and Construction

Analyzed by Accident Type and Classification

Struck-by NEC

- 1,443 accidents (28%)
  - Hand Tools were majority
    - Knives, wrenches, hammers, axes, crowbars
      - Severity was low
35 permanently disabling injuries:

- 30 amputations
- Most involved fingers
- Lock out / Tag out issues
- Struck-by events
Welding/Cutting (n = 330)

- 130 eye

Factors:

- Improper PPE
- Lack of use of PPE
- Inadequate protection for bystander employees
Welding/Cutting Eye Injuries

Total Welding/Cutting Injuries
330

Eye Injuries
130

Total Welding/Cutting Injuries
Total Eye Injuries from Welding/Cutting
POWERED HAND TOOLS (n = 329)

- 127 eye injuries
- 90 hand, fingers
- 0 fatalities
- 4 permanent disabilities
- 135 restricted duty or days lost

Grinders - 151 accidents
- 95 eye
Powered Hand Tool Injuries

329 Total Powered Hand Tool Injuries
- 90 Hand & Finger Injuries (27% of Tot.)
- 127 Eye Injuries (39% of Tot.)

151 Grinder Injuries
- 95 Eye Injuries from Grinders (63% of Tot.)
MRC ACCIDENTS BY TYPE OF EQUIPMENT

Conveyors (314)
- 88 finger
- 35 hand
- 23 arm

Crushers (252)

Front-end loaders (230)
Injuries by Equipment
12,147 Total Injuries

- 314 Conveyor Injuries
  - 23 Arms (7%)
  - 35 Hand Injuries (11%)
  - 88 Finger Injuries (28%)
- 252 Crusher Injuries
- 230 Front-end Loader Injuries
High Frequency, Low Severity Injuries

Usually involve:
- eye (foreign object penetration)
- fingers (cuts)
- hand/arms (cuts)

A reduction will have a significant impact on the total incidence rate.
Recommendations

Analyze all maintenance jobs for potential hazards, then identify and implement best safety practices.
Recommendations

*Place greater emphasis on prevention*

- Dramatic improvements can be made in injury prevention by paying more attention to proper and safe use of hand tools (knives, hammers and wrenches)

- And proper, consistent use of PPE (gloves, safety glasses, etc.)
Recommendations

Start Each Day with a Safety Meeting

MEET FIRST FOR SAFETY!
MSHA-NSSGA ALLIANCE
Benefits of Starting Each Day with a SAFE PRODUCTION MEETING

- Focuses attention
- Promotes communication
- Enhances collective thinking
- Determines readiness
Further Research

Analyze the data for injuries involving the operation of mobile equipment

To identify trends re: operator experience, training, equipment age and condition, types of accidents and specific operator tasks involved.
Further Research

Analyze more thoroughly other activities that contribute significantly to injuries to identify trends and develop intervention strategies:

- handling supplies and materials
- climbing on and off equipment/machines
- walking and running
Further Research

Analyze MSHA’s violation history data to:

- identify trends and areas where improvement is needed, and
- determine if existing enforcement efforts are properly focused
Further Research

Establish teams to analyze jobs most linked to accidents to

- identify the knowledge, skills, information, procedures and tools needed to perform them correctly, and

- design effective training programs and intervention strategies
Further Research

Identify trends in types of accidents involving conveyors, crushers and front-end loaders, specific work activities being performed on this equipment, and occupation and experience of the injured employees.

Analyze occupational illness data for trends and prevention strategies.
Natural building blocks for quality of life

MSHA/ NSSGA ALLIANCE - Injury and Illness Data Analysis Team