

Case Study: Dimension Stone

How Miners Get Hurt

At Dimension Stone Operations



Case Study

- The development and implementation of safety programs in the mining industry can help employers prevent accidents. These programs provide the direction and guidance for employees to work safe. However, any company's safety program and reputation is only as good as the results they produced. Our case study involves a small dimension stone quarry in upstate New York.

Quarry History

MSHA History

- Higher than average industry lost time rate
- History of repeated violations
- Currently contesting 7 citations
- Currently delinquent in 4 citations
- \$10,505.00 Total Dollars fined since 2004
- 13 citations for noise overexposure since 05-07
- 2 citations for respirable quartz since 05-07
- Put on MSHA Accident Reduction Program in 2009

Workers' Comp Insurance History

- More accidents always mean higher workers' comp premiums. As the result of their poor accident record, their Insurance Carrier failed to renew their workers' compensation policy in 2004 and the company has been forced to pay their claims out of a self-insured trust until their experience rating is reduced to insurable levels.

MSHA Overview: Quarry

Year	NFDL Operator Injuries	Operator Hours Worked*	Operator NFDL Incidence Rate**	Mine Type National Fatal Incidence Rate**	Mine Type National NFDL Incidence Rate**
1995	4	53,554	14.94	0.0183	3.34
1996	8	63,140	25.34	0.027	3.14
1997	10	67,491	29.63	0.0211	3.11
1998	16	83,746	38.21	0.0187	3
1999	10	83,003	24.1	0.0166	2.92
2000	7	100,855	13.88	0.0183	3.11
2001	2	124,608	3.21	0.005	2.83
2002	4	108,339	7.38	0.0224	2.67
2003	2	119,396	3.35	0.0087	2.65
2004	1	146,076	1.37	0.0117	2.62
2005	2	171,540	2.33	0.0178	2.51
2006	8	190,156	8.41	0.0143	2.3
2007	3	230,612	2.6	0.0099	2.18
2008	7	145,027	6.9	0.0048	2.06

Totals

84

1,687,543

12.975

versus

2.745

Case Study: Dimension Stone

Repeat Violation History

Repeat Violation History 7/3/2008 through 10/2/2009.

CFR Standard/Mine Act Cited	Instances	RPID See Explanation	RPID Points See Table
56.3131	2	N/A	--
56.9300(b)	1	N/A	--
56.12023	1	N/A	--
56.12030	1	N/A	--
56.12032	1	N/A	--
56.14100(d)	1	N/A	--
56.14103(b)	1	N/A	--
56.16005	1	N/A	--
56.20003(c)	1	N/A	--
The Total Number of Violations	10		
Divided by 4 Inspection Days = Viols Per Inspect Day (VPID)	2.500000000		
VPID Penalty Points (See Table VI Operators - 30 CFR 100.3.)	25		

Case Study: Dimension Stone

Repeat Violation History

Repeat Violation History 10/7/2008 through 1/6/2010

CFR Standard/Mine Act Cited	Instances	RPID See Explanation	RPID Points See Table
56.14103(b)	3	N/A	--
56.14112(b)	2	N/A	--
56.3131	2	N/A	--
56.4200(b)(2)	1	N/A	--
56.9300(b)	1	N/A	--
56.15004	1	N/A	--
56.16005	1	N/A	--
56.20003(c)	1	N/A	--
56.12023	1	N/A	--
56.12030	1	N/A	--
56.12032	1	N/A	--
56.14100(b)	1	N/A	--
The Total Number of Violations	16		
Divided by 2 Inspection Days = Viols Per Inspect Day (VPID)	8.0000000000		
VPID Penalty Points (See Table VI Operators- 30 CFR 100.3.)	25		

Case Study:

Review of Reported Accidents

- The following **29** cases, as reported to MSHA, show a definitive pattern regarding the *ineffective* implementation of a safety and health program.
- Injuries can be prevented by effective supervision and training. It is apparent that this employer does not support either.

Case Study:

Review of Reported Accidents

- 8/30/2004 No Days Away From Work, No Restrictive Action
- Handtools (nonpowered) Laborer/utility man/bull gang hand tools (not powered)
- Employee works splitting stone with a mason hammer. While trimming stone a piece of steel flew off hammer and penetrated his face.

Case Study:

Review of Reported Accidents

- 4/9/2004 Days Away from Work Only
- Machinery Laborer/utility man/bull gang
- Operate mill equipment
- Employee was palletizing material (capstones) when a piece tipped over & pinched his leg against the pallet. Employee reported bruising & some swelling but continued to work. After 2 weeks he was complaining of pain & decided to go to the doctor. Dr did x-rays & found a fracture in the tibia. 1st visit to dr on 4-23-04. Employee worked from 4-9-04 to 4-23-04.

Case Study:

Review of Reported Accidents

- 4/5/2005
- Days Restricted Activity Only
- Handling of materials
- Laborer/utility man/bull gang
Handling coal/rock waste/ore
- Employee was attempting to move loose material around to position for further splitting when he pinched his finger between two stones.

Case Study:

Review of Reported Accidents

- 8/15/2005 Days Away from Work Only
- Handling of materials
- Bulldozer/tractor oper.
Handling coal/rock waste/ore
- Employee was attempting to move a piece of material (rubble stone) on a skid when an adjacent piece fell over cutting her knee. Laceration to right knee requiring stitches was result of incident.

Case Study:

Review of Reported Accidents

- 3/31/2006 Days Away From Work & Restricted Activity
- Handling of materials
- Laborer/utility man/bull gang
Handling coal/rock waste/ore
- Employee was positioning material for splitting when one piece of stone fell and hit his hand pinching between another rock

Case Study:

Review of Reported Accidents

- 4/21/2006 No Days Away From Work, No Restrictive Action
- Slip or fall of person
- Supervisory/management/foreman/boss
- Get on/off equipment/machines
- Employee stepped off a truck ladder and tripped in a hole, falling backwards and hitting his arm on the truck parked next to him. Employee received a laceration to his left bicep.

Case Study:

Review of Reported Accidents

- 5/23/2006 Days Restricted Activity Only
- Slip or fall of person
- Laborer/utility man/bull gang
Handling supplies/materials
- Employee was carrying a pc of material when he tripped and fell on his back

Case Study:

Review of Reported Accidents

- 7/8/2006 Days Away from Work Only
- Handling of materials
- Laborer/utility man/bull gang
Handling coal/rock waste/ore
- Employee was attempting to lift a piece of stone from a flat position to a vertical position when it slipped out of his hands and fell on his foot above the steel toe breaking the left metatarsal bone.

Case Study:

Review of Reported Accidents

- 8/24/2006 No Days Away From Work, No Restrictive Action
- Handling of materials
- Laborer/utility man/bull gang
Handling coal/rock waste/ore
- Employee was throwing a piece of stone into a dumpster when the piece of stone broke and cut his arm.

Case Study:

Review of Reported Accidents

- 9/7/2006 Days Away From Work & Restricted Activity
- Handling of materials
- Mechanic/repairman/helper
Handling supplies/materials
- Employee was lifting something into the back of a service truck when he sustained a back strain

Case Study:

Review of Reported Accidents

- 9/29/2006 Days Away from Work Only
- Handling of materials
- Laborer/utility man/bull gang
Handling supplies/materials
- Employee was lifting material when he sustained a back strain.

Case Study:

Review of Reported Accidents

- 10/28/2006 Days Away From Work & Restricted Activity
- Machinery Stone finishing/sizing personnel
- Operate surface equipment, nec
- Employee was using a diamond bladed masonry saw when a piece of stone became jammed in blade. Employee attempted to remove the material when the saw blade re-engaged and pulled his hand into the blade.

Case Study:

Review of Reported Accidents

- 11/8/2006 Days Away from Work Only
- Slip or fall of person
- Bulldozer/tractor operator
Get on/off equipment/machines
- Employee was exiting her piece of equipment when she lost her balance and fell. When she tried to catch herself she jammed her hand against the piece of equipment.

Case Study:

Review of Reported Accidents

- 11/11/2006 Days Away From Work & Restricted Activity
- Machinery Laborer/utility man/bull gang
Operate surface equipment, nec
- Employee was using a log splitter when he pinched his finger between a piece of wood and the splitter.

Case Study:

Review of Reported Accidents

- 2/21/2007 Days Away from Work Only
- Machinery Laborer/utility man/bull gang
- Operate mill equipment
- Employee was using a stone cutting saw when he was not following proper procedure and placed his hand in the path of the blade causing a laceration to his right hand.

Case Study:

Review of Reported Accidents

- 5/3/2007 Days Away from Work Only
- Stepping or kneeling on object
- Laborer/utility man/bull gang
Get on/off equipment/machines
- Employee was stepping out of his personal truck in the employee parking area when he twisted his left knee.

Case Study:

Review of Reported Accidents

- 6/5/2007 No Days Away From Work, No Restrictive Action
- Handtools (nonpowered) Sizing/washing/cleaning plant operator/worker Hand tools (not powered)
- Employee was splitting stone, using a 16lb stone splitting hammer, when a piece of steel chipped off the hammer head and struck him in the arm. The small pc of steel punctured his arm and has to be removed.

Case Study:

Review of Reported Accidents

- 7/30/2007 No Days Away From Work, No Restrictive Action
- Handling of materials
Supervisory/management/foreman/boss
Handling coal/rock waste/ore
- Employee pinched finger between a large piece of stone and crate, while packaging stone, causing a laceration requiring a couple of stitches.

Case Study:

Review of Reported Accidents

- 8/27/2007 Days Restricted Activity Only
- Handling of materials
- Mechanic/repairman/helper
Idle (lunch/coffee break/no power)
- Employee reached into an unguarded exhaust fan to open the cover, causing fingers to strike fan blades.

Case Study:

Review of Reported Accidents

- 4/15/2008 Days Away From Work & Restricted Activity
- Handling of materials
- Stone finishing/sizing personnel
Handling supplies/materials
- Employee was trying to lift more weight than the left shoulder would support. NOTE: Employee worked on light duty from date of injury until 5/29/08. On 5/29/08 Dr. placed employee on lifting restrictions that we could not honor. He was released to full duty on 6/5/08.

Case Study:

Review of Reported Accidents

- 6/27/2008 Days Restricted Activity Only
- Machinery Stone finishing/sizing personnel
Operate surface equipment, nec
- No conditions contributed to the accident, employee did not follow proper procedure.

Case Study:

Review of Reported Accidents

- 7/22/2008
- Days Restricted Activity Only
- Handling of materials Sizing/washing/cleaning plant opr/worker Handling coal/rock waste/ore
- No conditions/employee being in improper position when the stone is being cut.

Case Study:

Review of Reported Accidents

- 8/6/2008 Days Away From Work & Restricted Activity
- Handling of materials
- Stone finishing/sizing personnel
Handling coal/rock waste/ore
- No contributing factors/ Employee had improper hand placement.

Case Study:

Review of Reported Accidents

- 8/21/2008 Days Away from Work Only
- Handling of materials Laborer/utility man/bull gang hand load; hand shoveling/mucking
- Large piece of stone came off belt and crushed finger between another piece of stone.

Case Study:

Review of Reported Accidents

- 8/21/2008 Days Away from Work Only
- Handling of materials
- Laborer/utility man/bull gang
Hand load; hand shoveling/mucking
- Large piece of stone came off belt and crushed finger between another piece of stone.

Case Study:

Review of Reported Accidents

- 10/3/2008 Days Restricted Activity Only
- Other Sizing/washing/cleaning plant opr/worker
- Operate surface equipment, nec
- No conditions contributing

Case Study:

Review of Reported Accidents

- 10/18/2008 Days Away from Work Only
- Handling of materials
- Sizing/washing/cleaning plant opr/worker
- Handling coal/rock waste/ore
- No conditions contributing.

Case Study:

Review of Reported Accidents

- 4/27/2009 Days Away from Work Only
- Handling of materials
- Sizing/washing/cleaning plant opr/worker
- Handling coal/rock waste/ore
- Employee smashed finger between two pieces of stone

Case Study:

Review of Reported Accidents

- 5/21/2009 Days Away from Work Only
- Handling of materials
- Sizing/washing/cleaning plant opr/worker
- Handling coal/rock waste/ore
- Employee smashed right pinky finger between two pieces of stone, causing a laceration to finger.

Accident Summary

- **Direct Causes**

- Lack of proper PPE
- Ineffective inspection/oversight of unsafe hand tools
- Ineffective workplace examination to identify unsafe conditions
- Poor ergonomic design of equipment and tasks assigned

Accident Summary

- **Contributing Factors**
 - Ineffective Supervision
 - Ineffective Part 46 Training
 - Including New Miner, Task & Annual Refresher
 - Lack of Implementation of Comprehensive Safety and Health Program
 - Lack of Comprehensive Workplace Examination Program

Examination of Working Places

30 CFR § 56.18002

- (a) A competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such conditions.
- (b) A record that such examinations were conducted shall be kept by the operator for a period of one year, and shall be made available for review by the Secretary or his authorized representative.
- (c) In addition, conditions that may present an imminent danger which are noted by the person conducting the examination shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affected (except persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977) until the danger is abated.

Case Study:

Workplace Inspection

- Effective Supervision and Safety Training involves a consistent approach to daily workplace examination. Documentation of the required workplace examinations is required by 30 CFR 56.18002 and provides an effective way to minimize unsafe condition and practices that lead to accidents.
- The following examples at this stone quarry should be analyzed as proof that a safety program may be headed in the wrong direction.

Case Study:

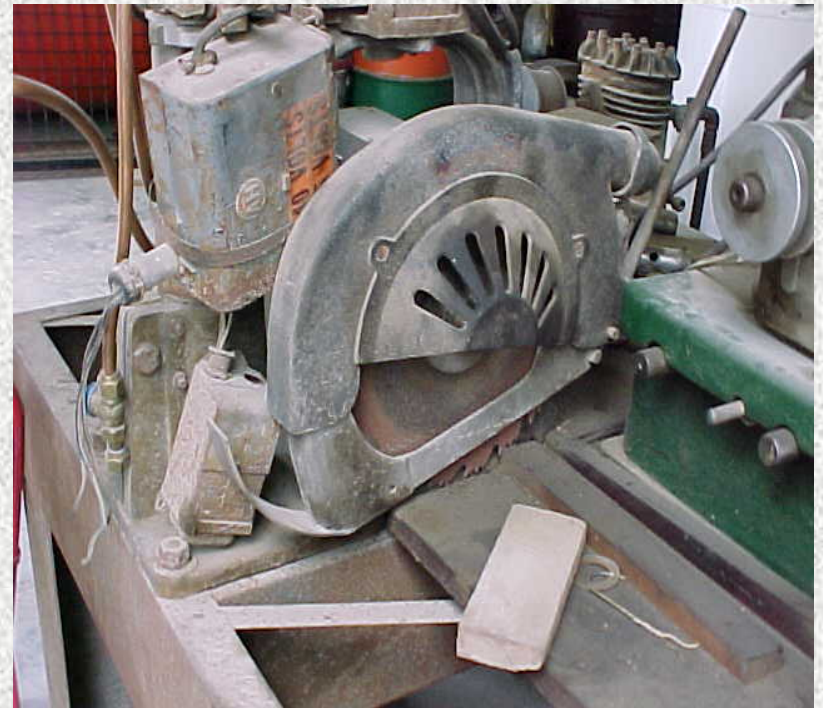
Workplace Inspection

- Use of Hand Tools
 - Worn cracked tools increase the chance of an accident.
 - This in combination with an ineffective PPE Program that addresses employee exposure produces more lost time accidents



Case Study: Workplace Inspection

- Use of Power Tools
 - Worn, defective power tools need to be taken out of service and tagged “DO NOT USE”



Case Study: Workplace Inspection

- Health Hazards
 - Ineffective training produces more back and shoulder injuries, heat related conditions such as heat stroke and fatigue and may contribute to other sun related conditions such as skin cancer



Case Study: Workplace Inspection

- Health Hazards
 - Ineffective training also produces more back and shoulder injuries, arm, wrist and hand injuries



Case Study: Workplace Inspection

- Ergonomic Hazards
 - Improper workstation contributes to poor ergonomics and injury



Case Study: Workplace Inspection

- Material Handling
 - Manual handling of stone increases hand, eye injuries and back injuries



Case Study: Workplace Inspection

- Typical Material Handling



Case Study: Workplace Inspection

- Typical Storage



Case Study:

Workplace Inspection

- Rock Breaking
 - Poor Supervision allows this exposure to increase the chance of an accident.
 - Notice the slip and trip hazards that are routinely being created...



Case Study: Workplace Inspection

- Rock Breaking
 - Poor Supervision allows this exposure to increase the chance of an accident.
 - Notice the slip and trip hazards that are routinely being created...



Case Study: Workplace Inspection

- Machine Guarding
 - Ineffective guarding of moving machine parts highlight the failure to provide state of the art safety controls and proper task training to employees



Case Study: Workplace Inspection

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 - Ineffective guarding of moving machine parts highlight the failure to provide state of the art safety controls and proper task training to employees



Case Study: Workplace Inspection

- Improper Storage & Maintenance
 - Proper storage of PPE and other machinery and equipment will promote employee use and safety.



Case Study: Workplace Inspection

- Electrical Hazards
 - Failure to properly mark electrical installations and post adequate warning of these hazards decrease employee awareness and increase the chance of an electrical accident



Case Study: Workplace Inspection

- Haulage Hazards
 - Failure to properly berm all haul roads effectively increases the chance of a rollover accident



Case Study:

Workplace Inspection

- Traffic Patterns
 - Failure to properly post traffic signs and signals in areas where it is not evident who has the right of way effectively increases the chance of an equipment accident



Case Study:

Workplace Inspection

- Ground Controls
 - Failure to properly monitor and implement highwall inspection on as conditions warrant creates unsafe conditions



Case Study: Workplace Inspection

- Seat Belts
 - An effective safety program includes a strict seat belt policy for *all* mobile equipment



Case Study: Workplace Inspection

- Respiratory Protection
 - Proper use, maintenance and training of dust collection systems must be maintained at all times to be effective



Case Study:

Workplace Inspection

- Respiratory Protection
 - This system was poorly maintained and not in use



Case Study: Workplace Inspection

- Respiratory Protection
 - This system was poorly maintained and also not is use



Case Study: Workplace Inspection

- Respiratory Protection
 - An example that discourages employees to be safe and store PPE properly



Case Study:

Summary and Conclusion

- Compliance with MSHA regulations is a good first step in addressing workplace hazards, however the best way to reduce employee exposure and the number of accidents generated by this exposure is to provide effective training, supervision of employees and management of working conditions.

Case Study:

Summary and Conclusion

- Dimension stone operations, such as this stone operation should develop and implement comprehensive written safety and health programs and insure that all levels of management and supervision are held accountable.

Case Study:

Summary and Conclusion

- The cost of accidents has steadily reduced the number of employees and hours at this mine operation.
- This operation is plagued by high employee turnover.
- The following charts summarizes employment at from 2007-2009.

Prod. Year	Subunit Cd	Subunit	Annual Hrs.	Sum of Avg. Annual Emp.*
2009	03	Strip, Quarry, Open Pit	8719	5
2009	30	Mill Operation/Preparation Plant	73732	47
2009	99	Office Workers at Mine Site	5043	3
		Totals . . .	87494	55

2008	03	Strip, Quarry, Open Pit	10007	5
2008	30	Mill Operation/Preparation Plant	173850	80
2008	99	Office Workers at Mine Site	4376	2
		Totals . . .	188233	87

2007	03	Strip, Quarry, Open Pit	10133	5
2007	30	Mill Operation/Preparation Plant	215730	96
2007	99	Office Workers at Mine Site	4749	2
		Totals . . .	230612	103

Case Study:

Summary and Conclusion

- All mine operators should analyze the statistics they generate to determine how effective their programs really are.
- Company policies and procedures should be revised to reflect the changes necessary to correct deficiencies.
- Remember safety programs are only as good as the “people” who manage them...