

Safety and Risk Management

Construction by nature is.....

....inherently dangerous, with a high degree of hazard and risk.

- The toll of construction accidents is high in terms of both costs (\$) and human suffering
- Accidents add a tremendous burden of needless and avoidable expense
- Financial losses pale when compared to bodily injury and death, and the resulting human, social impacts

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Construction accidents.....

....add \$10 billion annually to construction cost

- Insurance (such as workmen' compensation) can be purchased to protect the contractor from certain direct expenses
- Accidents also involve substantial costs that are not insurable, referred to as *hidden* or *indirect* cost

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Economic considerations

- Direct costs
 - Medical
 - Compensation
- Indirect or hidden costs
 - Time lost from work by the injured party
 - Loss in earning power
 - Economic loss to injured worker's family
 - Lost time by fellow workers

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Economic considerations

- Indirect or hidden costs -- continued
 - Loss of efficiency by breaking up crew
 - Cost to train new or replacement employees
 - Damage to equipment and tools
 - Loss of production
 - Cost incurred by delays
 - Failure to meet contract demands (completion, etc)
 - Overhead costs associated with disruption of work

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Economic considerations

- Indirect or hidden costs -- continued
 - Cleanup and repair costs
 - Administrative costs of investigations and reports
 - Increased insurance premiums
 - Loss of future projects due to adverse publicity
 - Cost of fines
 - Many, many others difficult to quantify

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Accidents.....

....are defined as events occurring by chance from unknown causes. In reality, construction accidents are:

- the result of negligence
- needless
- avoidable

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As construction managers.....

....we must concern ourselves with the issues of safety for several reasons:

1. Legal obligations imposed by OSHA
2. Contract requirements
3. Direct and indirect financial impact (profit picture)
4. Corporate & personal legal liability (fiduciary duty)
5. Ethical duty and moral obligation
6. Public image and reputation

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The courts charge the employer (management) with the responsibility of :

1. Providing a safe place to work
2. Providing safe appliances, tools, and equipment
3. Developing and enforcing safety rules and regulations
4. Providing instructions regarding employment dangers

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Basic elements of a Safety Program as identified by the National Safety Council

1. Declaration of management policy and leadership
2. Assignment of responsibility, authority, and accountability
3. Maintenance of safe working conditions
4. Establishment of safety training
5. Establishment of an accident reporting and analysis system

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Basic elements of a Safety Program (continued)

6. Creation of medical and first aid programs
7. Acceptance of personal accountability by employees

Keys to a successful safety program

- Support and enforcement from top management
- Front line management (superintendents & foremen) consistently following and enforcing the safety program
- All employees recognizing that safety is everyone's job

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Safety Program Goals.....should be:

- » Achievable
- » Demanding
- » Supported by company resources
- » Well-defined
- » Measurable
- » Monitored

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Occupational Safety and Health Act....OSHA

- Established by Congress in 1970
- Part of the Executive Branch -- Department of Labor
- Goal of providing a safe and healthful workplace for all Americans
- OSHA Standards are part of the Code of Federal Regulations (CFR) published in the Federal Register
- OSHA Standards are found in Title 29 of the CFR
 - General Industry = 1910.xxx
 - Construction Industry = 1926.xxx

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Title	Code of Federal Regulations	Part	Section	Headings & Paragraphs
29	CFR	1926	0.59	(h)(2)(ii)

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OSHA....Key Standards

- Sec 5 (a)(1) "Each Employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees" -- **General Duty Clause**
- Sec 5 (a)(2) "Each employer shall comply with OSHA standards promulgated under this act"

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OSHA....Key Standards

- Sec 5 (b) "Each Employee shall comply with OSHA safety and health standards and all rules, regulations, and orders issued pursuant to this act which are applicable to his (or her) actions and conduct"
- 1926.16 (a) Rules of Construction – "In no case shall the prime contractor be relieved of overall responsibility for compliance with the requirements of this part of for all work performed under the contract"

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OSHA....Key Standards

- "Competent Person" means one who is **capable** of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has **authorization** to take prompt corrective measures to eliminate them.

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OSHA Inspections

- Reasons for inspection
 - Investigation of imminent dangers
 - Fatality and Catastrophic Investigation
 - Fatality(s)
 - 5 or more employees hospitalized for 24 hours
 - Complaints and referrals
 - Programmed Inspections – based on loss data
 - Target Program Initiatives

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OSHA Inspections

- Right to inspect
- Credentials
- Opening Conference
- Employer and Employee "Walkaround" Rights

Inspection Process

- Employee Interviews
- Closing Conference

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Citations and Penalties (per violation)

- Non Serious – up to \$7,000
- Serious – between \$1,500 to \$5,000
- Willful Violations – Up to \$70,000
- Repeat violations – original penalty multiplied from 1 to 10 times
- Criminal Penalties

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Considerations When Assessing Penalties

- Gravity of violation
- Good Faith Compliance Efforts
- History of Previous Violations

☒ Penalties can be adjusted down as much as 95%

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Part 1926 -- Safety and Health Regulations for Construction

- Subpart A - General
- Subpart B - General Interpretations
- Subpart C - General Safety and Health Provisions
- Subpart D - Occupational Health and Environmental Controls
- Subpart E - Personal Protective Equipment and Life Saving Equipment
- Subpart F - Fire Protection and Prevention
- Subpart G - Signs, Signals, and Barricades

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Part 1926 -- Safety and Health Regulations for Construction

- Subpart H - Materials Handling, Storage, Use, and Disposal
- Subpart I - Tools -- Hand and Power
- Subpart J - Welding and Cutting
- Subpart K - Electrical
- Subpart L - Scaffolds
- Subpart M - Fall Protection
- Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors

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Part 1926 -- Safety and Health Regulations for Construction

- Subpart O - Motor Vehicles, Mechanized Equipment, and Marine Operations
- Subpart P - Excavations
- Subpart Q - Concrete and Masonry Construction
- Subpart R - Steel Erection
- Subpart S - Underground Construction, Caissons, Cofferdams, and Compressed Air
- Subpart T - Demolition

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Part 1926 -- Safety and Health Regulations for Construction

- Subpart U - Blasting and the use of explosives
- Subpart V - Power Transmission and Distribution
- Subpart W - Rollover Protective Structures; Overhead Protection
- Subpart X - Stairways and Ladders
- Subpart Y - Diving
- Subpart Z - Toxic and Hazardous Substances

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*Part 1926 -- Safety and Health
Regulations for Construction*

www.osha.gov

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General Safety.....

*.....is the Prime
Contractor's (or CM's) responsibility*

- The contractor is responsible for the safety of
 - the employee & subcontractor workforce
 - owners, tenants, or users of the facility under construction
 - adjacent property: owners, tenants, or users
 - children (attractive nuisance)
 - pedestrian and motoring public

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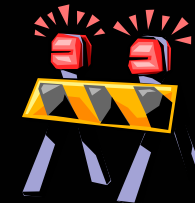
Types Traffic Control Standards.....

- Federal = Manual of Uniform Traffic Control Devices (MUTCD)
- State = Delaware - Traffic Controls for Streets and Highway Construction, Maintenance, Utility, and Emergency Operations
- Local
- Other Agencies

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Traffic Control Serves to.....

- Regulate
- Warn
- Guide



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Traffic Control Elements.....

- Advance Warning -- signs, variable message boards, arrow panels, public announcements (newspaper and radio), websites
- Channelizing Devices -- cones, drums, tubular markers, barricades, vertical panels, warning lights, pavement markings, reflective pavement markers (RPM's)

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Traffic Control Elements.....

- Barrier -- physical separation to protect the work space
 - should not be used for merging taper
 - should be interconnected for maximum performance (minimum length of 100')
 - require end protection such as crash cushions, tapered ends, impact attenuators
 - reflector panels or warning lights mounted on top for delineation

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Work Zone Components.....

- Barrier -- physical separation to protect the work space
 - Advance Warning Area
 - Transition Area
 - Buffer space
 - Work Space
 - Termination Area

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Financial Impact of Risk Management.....

- Experience Modification Factor (or Rate) (EMF or EMR)

$$EMF = \frac{\text{Actual Losses}}{\text{Expected Losses}}$$

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Financial Impact of Risk Management.....

- The Profit Margin Formula

$$\frac{\text{Loss}}{\text{Profit Margin}} = \text{Revenues needed to offset cost of Loss}$$

Profit Margin = 8%
Average Loss = \$5,478

$$\frac{\$5,478}{8\%} = \$68,474$$