Electrical Safety

Electricity can kill or severely injure people and cause damage to property. Every year many accidents at work involving electric shock or burns are reported. Even non-fatal shocks can cause severe and permanent injury. For example, shocks from faulty equipment may lead to falls from ladders, scaffolds or other work platforms. Those using or working with electricity may not be the only ones at risk – poor electrical installations and faulty electrical appliances can lead to fire, which may also cause death or injury to others. Most of these accidents can be avoided by careful planning and straightforward precautions.

What are the Hazards

- faults which could cause fire
- fire or explosion where electricity could be the source of ignition in a potentially flammable or explosive atmosphere
- Contact with live parts causing shock and burn – normal main voltage, 230 volts AC can kill

Assessing the risk

- Health and safety risk assessment should take into account the risks associated with electricity. It will help action you needed to take to use and maintain electrical installations and equipment and also how often maintenance is needed
- The risk of injury from electricity is strongly linked to where and how it is used. The risks are greatest in harsh conditions, for example:
- in wet surroundings – unsuitable equipment can easily become live and can make its surroundings live;
- outdoors – equipment may not only become wet but may be at greater risk of damage; and
- in cramped spaces with a lot of earthed metalwork such as inside a tank – if an electrical fault developed
  it could be very difficult to avoid a shock.

Electricity Is Dangerous

Whenever you work with power tools or on electrical circuits, there is a risk of electrical hazards, especially electrical shock. Anyone can be exposed to these hazards at home or at work. Workers are exposed to more hazards because job sites can be cluttered with tools and materials, fast-paced, and open to the weather. Risk is also higher at work because many jobs involve electric power tools.

Electrical trades workers must pay special attention to electrical hazards because they work on electrical circuits. Coming in contact with an electrical voltage can cause current to flow through the body, resulting in electrical shock and burns. Serious injury or even death may occur. As a source of energy, electricity is used without much thought about the hazards it can cause. Because electricity is a familiar part of our lives, it often is not treated with enough caution. As a result, an average of one worker is electrocuted on the job every day of every year!

Magnitude of electrical injuries in workplaces

Electrical injuries cause approximated 300-1000 deaths per year and result in about 3000 hospitalizations in specialized burn centers per year in the United States. Lightning injury causes 50-300 deaths per year in the United States. About 40% of serious electrical injuries are fatal. Deaths related to exposure to electric current consistently make up around 4% of all occupations fatalities. Injuries, if not fatal, are often severe. An epidemiological study of 383 cases of electrical injuries in China showed that there is a need to provide stronger preventive measures against electrical injuries.

Some items of equipment can also involve greater risk than others. Extension leads are particularly liable to damage – to their plugs, sockets, connections and the cable itself. Other flexible leads, particularly those connected to equipment which is often moved, can suffer from similar problems.

Reducing the risk

Once completed the risk assessment, findings to reduce unacceptable risks from the electrical equipment can be implemented in workplace. There are many things you can do to achieve this, and some of them are listed below.

Ensure people working on or with your electrical equipment or systems are 'competent' for the task

- Competent means having suitable training, skill, and knowledge for the task to prevent injury to themselves and others.

Ensure the electrical installation is safe, Make sure that:

- new electrical systems are installed to a suitable standard, and then maintain them in a safe condition;
- existing installations are maintained in a safe condition; and
- you provide enough socket outlets because overloading socket outlets by using adaptors can cause fire.

Risk factors for electrical injuries in the workplace:

- Not following safety procedures while working with electrical appliances
- Not wearing or having the necessary adequate or required personal protective equipment
- Failure to use insulated tools in areas where there are possible electrical hazards
- Poor and/or inadequate maintenance of equipment and loose-fitting plugs that can overheat and lead to fire
- Not implementing or following the necessary lockout/tagout procedures
- Inadequate worker and supervisor training in electrical safety
- Not implementing or following safe work procedures
- Failure to use the right tools for the job
- . Failure to isolate equipment from energy sources before handling equipment (i.e., working on 'live' electrical equipment)
- Failure to test every circuit and every conductor every time before touching it
- Not knowing the location of the main electricity supply in case of emergency
- Inadequate/poor wiring of electrical appliances or equipment
- Working with exposed electrical parts
- Working with overhead power lines
- Improper grounding of potential sources of electric currents and sparks
- Working with overloaded circuits
- Working under damp or wet conditions
- Working with damaged tools and equipment

Factors that have Limited Progress in Reduction of Electrical Injuries

- The widespread use and application of electricity
- Consistently poor or no compliance with existing Occupational Safety standards
- Many workers are not aware of or fail to identify the potential electrical hazards, electric shock and arc flash hazards present in their work place
- Humans, because of their highly developed nervous system, are very sensitive to very small amounts of electricity
- Lack of safety awareness and culture among workers handling electrical appliances
- Limited work experience, judgment, and decision-making ability, especially among newer and younger workers
- Overloading electric outlets with too many appliances
- Taking short cuts and perceived need to get job done fast

Provide safe and suitable equipment

- Choose equipment that is suitable for its working environment.
- Electrical risks can sometimes be eliminated by using air, hydraulic or hand-powered tools which are especially useful in harsh conditions.
- Make sure that equipment is safe when supplied and that it is then maintained in a safe condition.
- Provide an accessible and clearly identified switch near each fixed machine to cut off power in an emergency.
- For portable equipment, use socket outlets which are close by so that equipment can be easily disconnected in an emergency.
- The ends of flexible cables should always have the outer sheath of the cable firmly clamped to stop the wires (particularly the earth) pulling out of the terminals.
- Replace damaged sections of cable completely.
- Use proper connectors or cable couplers to join lengths of cable. Do not use strip connector blocks covered in insulating tape.
- Some types of equipment are double insulated. These are often marked with a 'double-square' symbol .The supply leads have only two wires – live (brown) and neutral (blue). Make sure they are properly connected if the plug is not moulded.
- Protect light bulbs and other equipment which could easily be damaged in use.
- In potentially flammable or explosive atmospheres, only special electrical equipment designed for these areas should be used. You may need specialist advice.

Reduce the voltage

One of the best ways of reducing the risk of injury when using electrical equipment is to limit the supply voltage to the lowest needed to get the job done, such as:

- temporary lighting can be run at lower voltages, e.g. 12, 25, 50 or 110 volts;
- where electrically powered tools are used, battery-operated ones are safest; or
- portable tools designed to be run from a 110 volt centre-tapped-to-earth supply are readily available.

Provide a safety device

If equipment operating at 230 volts or higher is used, an RCD (residual current device) can provide additional safety. An RCD is a device which detects some, but not all, faults in the electrical system and rapidly switches off the supply.

The best place for an RCD is built into the main switchboard or the socket outlet, as this means that the supply cables are permanently protected. If this is not possible, a plug incorporating an RCD or a plug-in RCD adaptor can also provide additional safety.

RCDs for protecting people have a rated tripping current (sensitivity) of not more than 30 milliamps (mA). Remember:

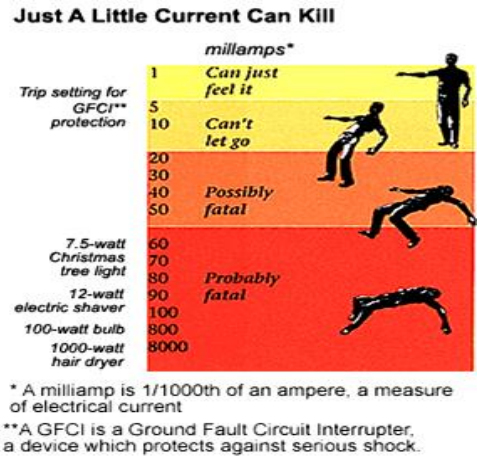
- an RCD is a valuable safety device, never bypass it;
- if it trips, it is a sign there is a fault – check the system before using it again;
- if it trips frequently and no fault can be found in the system, consult the manufacturer of the RCD; and
- the RCD has a test button to check that its mechanism is free and functioning – you should use this regularly.

Carry out preventative maintenance

All electrical equipment, including portable equipment and installations, should be maintained (so far as is reasonably practicable) to prevent danger; Decisions on maintenance levels and the frequency of checks should be made in consultation with equipment users, based on the risk of electrical items becoming faulty. There is an increased risk of this happening if the equipment isn't used correctly, isn't suitable for the job, or is used in a harsh environment.

How Shock Happens

Electricity always seeks the easiest path to the ground. It tries to find a conductor, such as metal, wet wood, water—or your body! Your body is 70% water. So if you touch an energized bare wire or faulty appliance while you are grounded, electricity will instantly pass through you to the ground, causing a harmful, or fatal, shock.



ELECTRICAL INJURY FACTORS MATRIX				
PHASES	HUMAN	VEHICLE AND EQUIPMENT	ENVIRONMENT	
			PHYSICAL ENVIRONMENT	SOCIO-ECONOMIC ENVIRONMENT
PRE-INJURY PHASE	Age, Medical Status Fatigue Training/Experience("unqualified") Hazard Awareness Safety Equipment Alcohol or Drug Use	Condition and Repair of Equipment: Faulty wiring High Voltage Broken Equipment First Aid Kit/Defibrillator	Lighting Damp or Wet condition Presence-over Head Power Line Use of Ladders Near Power Source	Affordability of Protective/Safety Equipment (employer) Work Safety Culture Availability of Training Courses Supervision("Buddy system")
INJURY PHASE	Protective Equipment Experience Training	High Voltage First Aid Kit/Defibrillator	Damp or Wet Conditions Unrecognized Hazard	Location of Injury Supervision("buddy system")
POST-INJURY PHASE	Availability of EMS/1st Responders Training Level of 1st Responders Injury Status of Worker	Availability of Emergency Equipment (Defibrillator, Ambulance) Call Phone(911) Ability to Asses Injury/Burn Status	Location of Injury and Distance To Emergency Trauma Centre	Co-Worker "buddy" Trained to Respond to Injury On-Site Staff Plan For Emergency

Electrical – Very basic

current—the movement of electrical charge
voltage—a measure of electrical force
circuit—a complete path for the flow of current
ground—a physical electrical connection to the earth
energized (live, "hot")—similar terms meaning that a voltage is present that can cause a current, so there is a possibility of getting shocked
conductor—material in which an electrical current moves easily
neutral—at ground potential (0 volts) because of a connection to ground
ampere (amp)—the unit used to measure current
shocking current—electrical current that passes through a part of the body
-You will receive a shock if you touch a live wire and are -- grounded at the same time.
-You will receive a shock if you touch two wires at different - voltages at the same time.
The danger from electrical shock depends on…
-the ***amount*** of the shocking current through the body,
-the ***duration*** of the shocking current through the body,
-the ***path*** of the shocking current through the body.

An appropriate system of maintenance is strongly recommended. This can include:

- user checks by employees, e.g. a pre-use check for loose cables or signs of fire damage;
- a visual inspection by someone with more knowledge, eg checking inside the plug for internal damage, bare wires and the correct fuse; and
- **where necessary**, a portable appliance test (PAT) by competent and licensed, to carry out a test and interpret the results.
- Monthly log of all electrical tools, cables and Distribution Boards can be maintained with scheduled and random inspection
- Colour code system of inspected items can be introduced

Damaged or defective equipment should be removed from use and either repaired by someone competent or disposed of to prevent its further use.

By concentrating on a simple, inexpensive system of looking for visible signs of damage or faults, most of the electrical risks can be controlled.
Although it is not a legal requirement, maintaining a record and labelling system can be a useful way to monitor and review the effectiveness of the maintenance scheme.

It is recommended that fixed installations (the wiring and equipment between the supply meter and the point of use, eg socket outlets) are inspected and tested periodically by a competent person.

Work safely

Make sure that people who are working with electricity are competent to do the job. Even simple tasks such as wiring a plug can lead to danger – ensure that people know what they are doing before they start.
Check that:

- suspect or faulty equipment is taken out of use, labelled 'DO NOT USE' and kept secure until examined by a competent person;
- where possible, tools and power socket outlets are switched off before plugging in or unplugging; and
- equipment is switched off and/or unplugged before cleaning or making adjustments.
- More complicated tasks, such as equipment repairs or alterations to an electrical installation, should only be carried out by competent people.
- work must not be allowed on or near exposed, live parts of equipment unless it is absolutely unavoidable and suitable precautions have been taken to prevent injury, both to the workers and to anyone else who may be in the area.

Underground power cables

Always assume cables will be present when digging in the street, pavement or near buildings. Use up-to-date service plans, cable avoidance tools and safe digging practice to avoid danger.
Service plans should be available from regional electricity companies, local authorities, highways authorities etc.

Overhead power lines

Over half of the fatal electrical accidents each year are caused by contact with overhead lines. When working near overhead lines, it may be possible to have them switched off if the owners are given enough notice. If this cannot be done, consult the owners about the safe working distance from the cables. Remember that electricity can flash over from overhead lines even though plant and equipment do not touch them.

- **arc-blast—**explosive release of molten material from equipment caused by high-amperage arcs
- **GFCI—g**round **f**ault **c**ircuit **i**nterrupter—a device that detects current leakage from a circuit to ground and shuts the current off
- **overload—**too much current in a circuit

Reference

The following websites and books have been referred in compiling this topic. They are also suggested for further readings to increase and enhancement of knowledge in health and safety.

WEBSITES

1. http://en.wikipedia.org/wiki/Bhopal_disaster
2. http://www.cdc.gov/niosh/topics/highwayworkzones/BAD/imagelookup.html
3. http://www.cdc.gov/niosh/az/a.html
4. http://chemicalsafety.com/
5. http://www.clipartguide.com/_search_terms/safety.html
6. http://www.rospa.com/occupationalsafety/adviceandinformation/health-and-safety-careers.aspx
7. http://www.epa.gov/wastes/nonhaz/municipal/dmg2/
8. http://en.wikipedia.org/wiki/Emergency_management
9. http://fyi.uwex.edu/agsafety/osha-wi-dairy-farm-lep/
10. https://www.gov.uk/government/publications/emergency-preparedness
11. http://www.environment.gen.tr/what-is-environment.html
12. http://www.eionet.europa.eu/gemet/concept?ns=1&cp=2778
13. http://en.wikipedia.org/wiki/Environmental_management_system
14. http://www.scafftag.co.uk/
15. http://www-group.slac.stanford.edu/esh/eshmanual/
16. http://www-group.slac.stanford.edu/esh/hazardous_activities/fall_protection/\
17. https://www.gov.uk/workplace-fire-safety-your-responsibilities/fire-safety-advice-documents
18. http://www.safetyvideosnow.com/Gory_Safety_Videos_s/42.htm
19. http://xnet.rrc.mb.ca/rcharney/guidelines%20for%20access%20scaffolding.htm
20. http://www.hanford.gov/page.cfm/HoistingRiggingManual
21. http://www.legislation.gov.uk/ukpga/1974/37/contents
22. http://www.healthandsafetytips.co.uk/Toolbox_Talks.htm
23. http://www.nhscareers.nhs.uk/explore-by-career/wider-healthcare-team/careers-in-the-wider-healthcare-team/support-services/health-and-safety-officer/
24. http://www.scsaonline.ca/classroom/hoisting-a-rigging-safety-awareness
25. http://www.jump4biz.com/BSP_Health_and_Safety_Management_faq_Measuring_Health_and_Safety.php
26. http://www.lboro.ac.uk/admin/hse/fire/
27. http://www.ntnu.edu/hse/guidelines/d
28. http://www.hse.gov.uk/index.htm
29. http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/hsw_acc_work_esms.htm
30. http://aehap.org/
31. https://osha.europa.eu/en/publications/reports/TE3008390ENC_chemical_risks
32. http://www.hse.gov.uk/workplacetransport/safetysigns/banksman/banksman.htm#
33. http://www.trafficsign.us/index.html
34. http://en.wikipedia.org/wiki/List_of_environmental_issues
35. http://www.ask-ehs.com/animation/showcase.htm?goback=.gde_4006766_member_209398648
36. http://actrav.itcilo.org/actrav-english/telearn/osh/noise/nomain.htm
37. http://guide8.net/material-safety-data-sheet-e816.pdf
38. http://www.drs.illinois.edu/css/factsheets/msdss.aspx
39. http://www2.worksafebc.com/Portals/MetalMineral/General.asp?ReportID=32710
40. http://www.myfuture.edu.au/The%20Facts/Work%20and%20Employment/Occupations/Details.aspx?anzsco=251312A
41. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/296_97_11
42. http://www.hse.gov.uk/waste/health.htm
43. http://www.hseaustralia.com.au/occupational-hygiene
44. http://www.ohsrep.org.au/hazards/chemicals/chemicals-management-in-workplaces/index.cfm
45. https://osha.europa.eu/en/topics/osm/reports/european_system_004.stm

46. http://www.medialabinc.net/osha-fire-safety.aspx
47. http://www.mysafetysign.com/osha-signs
48. http://www.safebottles.co.nz/News/Plastics+and+the+Environment.html
49. http://www2.worksafebc.com/Publications/OHSRegulation/Part14.asp?ReportID=18526
50. http://www.safetyrisk.com.au/safety-photos/
51. http://www.orchardhireandsales.ltd.uk/scaffold-ancillaries.htm
52. http://www.wisc-online.com/objects/MTL2702/mlt2702.htm
53. http://www.authorstream.com/Presentation/ashu912-661146-solid-waste-management/
54. http://infochangeindia.org/agenda/occupational-safety-and-health/status-of-occupational-safety-and-health-in-india.html
55. http://www.independent.co.uk/life-style/health-and-families/features/take-care-a-history-of-health-and-safety-in-the-workplace-2275437.html
56. http://ebookbrowsee.net/tbt-037-lifting-equipment-and-operations-pdf-d302813072
57. http://www.ehso.com/hmerg.php
58. http://www.toxicsaction.org/problems-and-solutions/waste
59. http://www.ehs.washington.edu/forms/index.shtm
60. http://www.didacindustrial.co.uk/courses/banksman/vehicle-banksman-training/
61. http://www.anr.state.vt.us/dec/wastediv/R3/decwpplan.htm
62. http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemwhatmsds.htm
63. http://www.dec.ny.gov/chemical/8732.html
64. http://www.elcosh.org/document/1666/d000573/OSHA%2527s%2BApproach%2Bto%2BNoise%2BExposure%2Bin%2BConstruction.html?show_text=1
65. http://www.indohistory.com/the_first_factories_act.html

BOOKS AND ARTICLES

1. Investigation Guidance, PART 1 The role of the senior manager, .Guidance and examples of good practices in accident investigation in Britain's railway industry, www.rssb.co.uk
2. Investigation Guidance ,PART 2 Development of policy and management arrangements, Guidance and examples of good practices in accident investigation in Britain's railway industry, www.rssb.co.uk
3. Investigation Guidance, PART 3 Practical support for accident investigators, Guidance and examples of good practices in accident investigation in Britain's railway industry, www.rssb.co.uk
4. Expert forecast on emerging chemical, risks related to occupational, safety and health, EUROPEAN RISK OBSERVATORY REPORT, European Agency for Safety and Health at Work
5. Chemical safety in the workplace, HEALTH AND SAFETY AUTHORITY, Ireland, www.hsa.ie
6. Safety in the use of chemicals at work, ILO , Geneva
7. Emergency Response Guidebook, 2008, A GUIDEBOOK FOR FIRST RESPONDERS DURING THE INITIAL PHASE OF A DANGEROUS GOODS/ HAZARDOUS MATERIALS TRANSPORTATION INCIDENT
8. HOW DO I READ A MATERIAL SAFETY DATA SHEET (MSDS)? Produced by the University of California, Los Angeles, Labor Occupational Safety and Health (LOSH) Program, August 2003.
9. NFPA 704 – 2007, FAQs, nfpa704@nfpa.org
10. http://en.wikipedia.org/wiki/File:Nalgene_bottles.jpg
11. Your steps to chemical safety, A guide for small business, Health and Safety Authority, Ireland
12. Confined spaces, A brief guide to working safely, HSE, UK
13. IACS, CONFINED SPACE SAFE PRACTICE, www.iacs.org.uk
14. A guide to Safety in Confined Space, by Ted Pettit and Herb Linn, US Department of Health and Human Services, Public Health Service, Center for Disease control, National Institute of Occupational and Health
15. Electricity at work, Safe working practices, HSE, UK
16. Electrical Safety , Safety and Health for Electrical Trades, Students Manual, US Department of Health and Human Services, Public Health Service, Center for Disease control, National Institute of Occupational and Health
17. Electrical Safety and You , HSE , UK
18. http://www.samhsa.gov/csatdisasterrecovery/preparedness/disasterReliefGrantProgramEPP.pdf
19. http://emc.uoregon.edu/content/mission-objectives-and-strategic-plan (Photo)
20. http://www.safetyplanninggroup.com/services.php#FSP (Photo)

21. Principal Emergency Response and Preparedness - http://scholar.google.com/scholar?q=Principal+Emergency+Response+and+Preparedness&hl=en&as_sdt=0&as_vis=1&oi=scholart&sa=X&ei=XM4cUvHfIKGf0QW58YCoAw&ved=0CCYQgQMwAA
22. https://www.osha.gov/OshDoc/data_General_Facts/factsheet-workplaceevergencies.pdf
23. emergency-exit-routes-factsheet –OSHA
24. Conducting an Accident Investigation, Oregon OSHA,, Department of Consumer and Business Services
25. Health and Safety Executive -Accident Investigations in Practice
26. http://www.labtrain.noaa.gov/osha600/refer/menu16a.pdf
27. evacuating-highrise-factsheet- OSHA
28. Planning and Responding to Workplace Emergencies- OSHA Factsheet
29. Environmental Emergency Plan, Environmental Guidelines, Correctional Service, Canada
30. EMERGENCY MANAGEMENT PLAN, (revised June 2012), University of Regina
31. FRAMEWORK FOR MAJOR EMERGENCY MANAGEMENT, GUIDANCE DOCUMENT 2, A GUIDE TO PREPARING A MAJOR EMERGENCY PLAN, JANUARY 2010,Fire Services and Emergency Planning Section, Department of the Environment, Heritage & Local Government, Custom House, Dublin
32. Mongbwalu Project Emergency Preparedness and Response Plan, Ashanti Goldfields Kilo S.A.R.L., Author- Briony Liber (MPhil (Environmental Management); CEAPSA)
33. Landon Borough of Havering, Emergency Planning Handbook
34. Environmental Accident Management Plan, Gethyn Powell Skips
35. EMERGENCY RESPONSE PLAN, USC School Of Dentistry
36. EMERGENCY PLANNING , EXTRACTION FROM: SAFETY MANAGEMENT SYSTEM FOR MAJOR HAZARD FACILITIES - BOOKLET 3: Part 7.17
37. How to prepare an emergency response plan for your small business, Worksafe BC
38. EMERGENCY MANAGEMENT PLAN, Illinios State University
39. GRIFFITH UNIVERSITY, EMERGENCY MANAGEMENT PLAN
40. ENVIRONMENTAL HEALTH EMERGENCY RESPONSE PLAN, Georgia department of Public health, Environment Health Section
41. Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 – Environmental Emergency Plans
42. Emergency Planning , Guidance for Hazardous Industry, Australian and New Zealand, Hazardous Industry Planning Taskforce
43. Emergency Management Australia , EMERGENCY PLANNING, Australian Government, Attorney- General's Department,
44. THE LONDON BOROUGH OF HAVERING, EMERGENCY PLANNING AND BUSINESS CONTINUITY SERVICE, MAJOR EMERGENCY PLAN Jan 2012 Version 1.1
45. Environmental Management Guidelines for Small Businesses, Raising Environmental Awareness, Published by the Small Firms Association , Dublin
46. A COMPARATIVE STUDY ON ENVIRONMENTAL, AWARENESS AND ENVIRONMENTALLY BENEFICIAL, BEHAVIOR IN INDIA, CMS ENVIS Centre, Centre for Media Studies, New Delhi
47. CCC Environmental plan, TEP, Mauritania
48. Management of Noise and Vibration: Construction and Maintenance Activities , OPERATIONAL INSTRUCTION 21.7, Department of planning, Transport Infrastructure, Government of South Australia
49. ENVIRONMENTAL MANAGEMENT GUIDELINES, CONTRACTOR REQUIREMENTS, Nakheel
50. Chapter 11, Environmental Management Systems ,Indiana Small Business Guide to Environmental, Safety and Health Regulations
51. Manual for Implementing EMS in SME, http://www.ifc.org/ifcext/enviro.nsf/content/EMS
52. Second Edition, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations , NSF International, Ann Arbor, Michigan
53. Standardizing Excellence: Working with Smaller Businesses to Implement Environmental Management Systems, Green Business Network , The National Environmental Education & Training Foundation
54. Construction Impact Mitigation, Best Practice #13 ,Best Practices for Sustainable Wind Energy Development in the Great Lakes Region | Great Lakes Wind Collaborative
55. BRITISH COLUMBIA , HAZARDOUS MATERIAL RESPONSE PLAN , Ministry of Environment
56. IEMA, Introduction to Environment management System,
57. What Is Integrated Solid Waste Management? United States Environmental Protection Agency, Solid Waste and Emergency Response
58. introduction_solid_waste_management_kfw_en[1]
59. Construction Site Safety , 31. Part 1. Waste Management , CITB
60. Construction Site Safety , 31. Part 2. Environmental Management, CITB

61. Module 17, Pollution Control, CHSS, NEBOSH , IGC, Course
62. Guidelines for the Treatment of Noise and Vibration in National Road Schemes, NATIONAL ROADS AUTHORITY
63. NOISE AND VIBRATION ASSESSMENT FACT SHEET – JUNE 2010, British Columbia, Canada
64. MRA – Helena West: Noise and Vibration Management Plan, Australia
65. Hazardous Materials Emergency Planning Guide , NATIONAL RESPONSE TEAM
66. Semporna Islands Project Educational and information materials produced in Bahasa Malaysia and English
67. Tool Kit for Solid Waste Management Intermountain Region - National Park Service
68. Solid Waste Management in Emergencies, www.iboro.ac.uk/wedc
69. EMERGENCY RESPONSE PLAN, MINISTRY OF THE ENVIRONMENT, Ontario
70. TCMT Environment Management CEMP, TEP, Mauritania
71. TECHNICAL NOTES ON DRINKING-WATER, SANITATION AND HYGIENE IN EMERGENCIES , WHO
72. DEVELOPING INTEGRATED SOLID WASTE MANAGEMENT PLAN TRAINING MANUAL, United Nations Environment Programme
73. Construction depots near sensitive water resources, Water quality awareness brochure no. 14 June 2008, Department of Water, Government of Western Australia
74. What a Waste: May 1999 , Solid Waste Management in Asia, Urban Development Sector Unit East Asia and Pacific Region, The International Bank for Reconstruction and Development/THE WORLD BANK, Washington, USA
75. Environment, Mayank Kumar
76. TRADES GUIDELINES – EXCAVATION AND TRENCHING, Construction Safety Association
77. TRENCHING SAFETY ,INTRODUCTION TO TRENCHING HAZARDS , Infrastructure Health & Safety Association, Canada
78. EXCAVATION SAFETY GUIDE & DIRECTORY , Pipeline Association for Public Awareness
79. A Guide to Safety in Excavations, Health and Safety Authority, Dublin
80. Excavation Safety SLAC National Accelerator Laboratory , Environment, Safety & Health Division
81. APPROVED CODE OF PRACTICE FOR SAFETY IN EXCAVATION AND SHAFTS FOR FOUNDATIONS, Published by the Occupational Safety and Health Service, Department of Labour, Wellington , New Zealand
82. A Guide to OSHA Excavations Standard, Occupational Safety and Health Division , N.C. Department of Labour
83. EXCAVATION WORK , Code of Practice, Safe Work Australia
84. Excavation Safety, Division of Workers' Compensation, Texas
85. Safety Manual for Excavation, Bureau of Workers Compensation, Ohio
86. Excavations, Occupational Safety and Health Administration, U.S. Department of Labor
87. Soil description and classification, Based on part of the GeotechniCAL reference package, by Prof. John Atkinson, City University, London
88. What is soil plasticity? B.C.'s Watershed Restoration Technical Bulletin
89. Controlling fire and explosion risks in the workplace, HSE, UK
90. EMPLOYEE FIRE AND LIFE SAFETY, National Fire Protection Association
91. FIRE SAFETY HANDBOOK, For Apartment Managers, Seattle Fire Department Fire Prevention Division
92. Fire & Life Safety Management Guide, www.hopkinsmedicine.org/hse/guidance
93. Fire safety in construction, HSE, UK
94. Fire Safety in workplace, OSHA Factsheet, OSHA
95. Workplace health, safety and welfare, Workplace (Health, Safety and Welfare) Regulations 1992, Approved Code of Practice, HSE, UK
96. Flame arresters, HSE, UK
97. Management of health and safety at work, Management of Health and Safety at Work Regulations, 1999, Approved Code of Practice & guidance, HSE, UK
98. A short guide to making your premises safe from fire, Regulatory Reform (Fire Safety) Order 2005, Chief Fire Officer's Association, HM Government
99. Safe handling of combustible dusts: Precautions against explosions, HSE, UK
100. Fire Safety for Wheelchair Users at Work and at Home, United Spinal Association, Jackson Heights, NY
101. Confined Space Guidelines, www.labour.gov.on.ca
102. Hot work safety guidelines 2011, The Federation of Finnish Financial Services, Bulevardi , Helsinki
103. Managing Hot Work, Workplace Health and Safety Bulletin, Alberta
104. UC Monthly Safety Spotlight, February 2012, Shop and Tool Safety, Electrical Safety, What is "EI-LOTO" and Why is it so Important?

105. Lockout/Tagout Manual, ENVIRONMENTAL HEALTH AND SAFETY, Iowa State University
106. PSU Lockout/Tagout Training for Authorized Employees, www.ehs.psu.edu
107. Introduction to principles and concepts of Effective Machine Guarding , OSTN Effective Machine Guarding
108. A Guide to Machine Safeguarding, Occupational Safety and Health Division , N.C. Department of Labor,
109. Code of practice on safety and health in the use of machinery, Programme on Safety and Health at Work and the Environment, INTERNATIONAL LABOUR ORGANIZATION
110. General Principles for Machine Safety: www.osh.govt.nz
111. Machine Guarding, Government of South Australia
112. Safeguarding Equipment and Protecting Employees from Amputations, OSHA
113. PRINCIPLES OF MACHINE GUARDING, NS Wales Gov.
114. Machine Safeguarding at the Point of Operation - A Guide for Finding Solutions to Machine Hazards , Oregon OSHA
115. NOISE AT WORK - Advice for employers, HSE, UK
116. Full-Body Safety Harnesses Installation, Operation, and Maintenance, AO Safety/SafeWaze User Instruction Harness Manual
117. A short guide to the Personal Protective Equipment at Work Regulations 1992, HSE, UK
118. OSHA GUIDANCE DOCUMENT, FALL PROTECTION IN RESIDENTIAL CONSTRUCTION
119. Falling Off Ladders Can Kill: Use Them Safely, OSHA
120. Nail Gun Safety A Guide for Construction Contractors , National Institute for Occupational Safety and Health, Department of Labor, Occupational Safety and Health Administration
121. OSHA Pocket Guide
122. Personal Protective Equipment, OSHA
123. Personal Protective Equipment, OSHA Factsheet
124. Personal Protective Equipment Selection Guide, Environmental Health & Safety Stony Brook University
125. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, SMALL ENTITY COMPLIANCE GUIDE FOR FINAL RULE FOR CRANES AND DERRICKS IN CONSTRUCTION
126. Worldwide Occupational Road Safety (WORS) Review Project, Department of Health and Human Services Centers for Disease Control and Prevention National Institute for Occupational Safety and Health,
127. Guidance on permit-to-work systems , A guide for the petroleum, chemical and allied industries, HSE UK
128. Permit to work systems, HSE UK
129. Guidelines on Permit to work ()PTW) systems, OGP
130. Temporary Structures Shoring, scaffolding, and underpinning, University of Washington, DEPARTMENT OF Construction Management
131. A Guide to Safe Scaffolding, N.C. Department of Labor Occupational Safety and Health Division