Cancer in construction and timber trades.
BWI fact sheet.

Workers in the construction and the timber trades are exposed to a variety of hazardous substances at work, some of which are known to cause cancer. Studies show that workers in our sectors have elevated risk of developing different types of cancer as a result of their occupational exposure.

The most widespread and best-known cause of cancer in the building trades is from asbestos, causing lung cancer and malignant mesotheliomas (cancer of the pleura, or lining, of the lung and stomach). Those who worked in heating and ventilation and in the production of asbestos cement are heavily exposed. Carpenters, plumbers, and any trades involved in repairs, maintenance, renovation or demolition of buildings which contain asbestos are also at risk.

Asbestos is not the only cancer hazard in our workplaces. Silica dust, wood dust, diesel exhaust, asphalt and welding fumes, epoxy resins, isocyanates, nickel, cobalt, chromium, copper, arsenic, formaldehyde, a wide variety of solvents, pesticides in timber treatments, such as lindane, tri butyl tin oxide, pentachlorophenol and others, unprotected exposure to strong sunlight causes high levels of skin cancers for outdoor workers in the construction and timber trades.

Elevated levels of cancers are found in workers in the construction and timber trades, including cancer of the lungs, respiratory system, stomach, oesophagus, blood and blood-forming organs. Bone cancer and melanoma in brickmasons. Stomach cancer in plasterers, roofers and brickmasons and construction labourers. Kidney and bone cancer in concrete finishers. Nasal cancer in plumbers. Sino nasal cancer in carpenters, furniture and cabinet makers. Lung cancer in carpenters, painters, roofers, plasterers, plumbers, pipefitters, steel erectors and construction labourers. Cancer of the oesophagus in carpenters, plasterers, roofers and construction labourers. Scrotal cancer and aplastic anaemia in electricians

Practical advice on reducing the workplace cancer risk.

The ILO Convention No 139 on preventing occupational cancers calls for the application of the following control measures:

Elimination. Removing carcinogens from the workplace, this is the preferred approach.

Substitution. The use of less hazardous alternatives

Isolation. By designating specific areas at a distance form the main working areas. Or by removing workers from areas where hazardous operations are underway. Less workers will be exposed, and those who are at risk of exposure can be properly protected during operations such as cutting timber or cement blocks or pipes, or during welding operations.

Engineering controls. General Ventilation, installing local exhaust ventilation systems on woodworking machinery, integrated dust bags on power tools for sanding or cutting, enclosure of hazardous operations, such as spray booths.

Safe work procedures. Damping down dust with water. Avoid use of power tools with certain products. Permit to work systems and designated work areas, as well as information and training.

Personal Protective Equipment. To be used together with other control measures above. Including: dust masks, respirators to protect against fumes, gloves, overalls, sun screen.

Asbestos. Suitable asbestos free alternatives available for all common uses. (See BWI factsheet http://www.bwint.org/default.asp?Index=621&Language=EN)

There is no reasonable argument for continued asbestos use and asbestos should be banned by governments and should not be used in workplaces.

For asbestos which is already installed in buildings, asbestos management plans should be prepared, supervised and adhered to. Employers should know where asbestos is in their premises, and should ensure a record is kept and workers are informed of its presence if there is any possibility it might be disturbed. All work with a potential asbestos exposure should be undertaken only by properly trained and protected workers. Dust levels should be kept as low as practicable. Workers should be provided with appropriate health surveillance and all exposures should be recorded in an asbestos register.

Hazards website: www.hazards.org/asbestos <http://www.hazards.org/asbestos> . BWI asbestos webpages: http://www.bwint.org/default.asp?Issue=asbestos&Language=EN <http://www.bwint.org/default.asp?Issue=asbestos&Language=EN> List of asbestos substitutes: http://www.bwint.org/default.asp?Index=621&Language=EN

<http://www.bwint.org/default.asp?Index=621&Language=EN> .
TUC asbestos management checklist: http://www.tuc.org.uk/h_and_s/tuc-7194-f0.cfm

Silica. Exposure to crystalline silica should be minimised.Exposure occurs in stone masonry, façade renovation, blast cleaning of of buildings, demolition work, concrete scabbling, cutting or drilling, tunneling. Silica causes silicosis, fibrosis and lung cancer. The scarring of the lung tissue causes shortness of breath. The effect of breathing in silica continues to develop after exposure has stopped, and the effects are irreversible. Prevention is the key.

In construction, alternatives should be considered at the design stage. Exposures to silica used in construction (brickwork, plaster, cement, concrete) can be reduced by proper design and planning. It is important to cut cement pipes and blocks offsite or in a designated area so that less workers are exposed, and those who may be exposed can be properly protected to avoid breathing in cement dust. Also, cable conduits can be formed in concrete or built into design, removing the need to chase conduits [cut using stilsaws/stone saws or angle grinders] in brick or concrete. Local exhaust ventilation should be provided on all power tools. Exposure to silica in cement and plaster should be minimised. Damping down dusty jobs using water is a cheap and simple way of reducing exposure. Suitable disposable masks, regularly replaced, should be used where alternative methods or control are not available.

LHSFNA silica advice.
http://www.lhsfna.org/index.cfm?objectID=EAE2B639-D56F-E6FA-9CF04EB847720309 Amicus silica webpages:
http://www.amicustheunion.org/Default.aspx?page=4740

Asphalt (bitumen)

Used in paving and roofing, when asphalts are heated, vapours are released and, as these vapours cool, they condense. Workers are exposed to asphalt fumes and vapours. Studies have shown increased risk of head and neck cancers and of lung cancers among

workers engaged in road paving, asphalt mixing, roofing and waterproofing work. Other cancers affecting asphalt workers are of the stomach and the bladder. Some jobs have higher exposures than others. For example , the kettle operator on roofing jobs has higher risk of exposure than the workers applying the roofing material. The kettle operator has to open the kettle to add new asphalt and to check viscosity. In some studies, people who operate the paving machinery have higher exposure than other paving workers. Labourers and truck drivers also have high exposures. Proper protective clothing and good ventilation are essential in reducing exposure.

http://www.inchem.org/documents/cicads/cicads/cicad59.htm

Metals. Substances including arsenic, nickel, cadmium, beryllium and chromiumcan cause cancer. One of the main areas where construction workers are exposed is in welding operations. All welding produces fumes and gas. The type depends on the composition of the metal being welded, including any surface coating, and the composition of the electrodes (the welding rod), the welding method (MIG TIG or stick). Among the main gases produced are carbon monoxide, carbon dioxide, nitrogen dioxide and ozone. Fumes produced may include cobalt, nickel, manganese, chromium (eg in stainless steel and alloyed steels), cadmium (in some paints and thinners) and copper and lead (usually in the electrodes). Welding fumes produce a wide variety of elements which are known to be toxic and some which are known to, or are suspected to, cause cancer.

Precision welding brings particular problems with argon arc (TIG), metal inert gas (MIG), electron beam, resistance, laser and plasma arc welding. Inert gas types such as MIG makes it difficult to detect gases, because the arc is shielded by gas to prevent against atmospheric contamination that might cause faults in the weld material.

Welding or “hot working” must always be carried out under a permit to work system.

Some countries have exposure limits for these substances, (the amount of a substance that is considered too much) but in real life, inspectors do not normally present themselves on building sites to take air samples.

As a rough guide, on NO account should fumes be visible in the atmosphere away from the immediate vicinity of the welding point.

Good ventilation is the key to safe welding, particularly in confined spaces where fumes can build up to high concentrations.

Paints and coatings should be removed before welding begins.

Timber treatments = toxic treatments.

Pesticides are used to treat timber to prevent insect or fungal infestation. Many contain metals like copper, chromium and arsenic (CCA), sometimes this is visible in sunlight as a slighty green colour on the timber. Other pesticides used to treat timber can also cause cancer, for example, lindane, pentachlorophenol or tributyl tin oxide. These chemicals can be replaced with with safer alternatives, such as boron compounds. Personal protective equipment should be provided where other methods are unsuitable or insufficient. TURI website: www.turi.org <http://www.turi.org/> Pesticides Action Network: www.panna.org <http://www.panna.org/> . PAN pesticides database, including safer alternatives: http://www.pesticideinfo.org/Index.html

Solvents and other chemicals. Organic solvents including benzene, toluene, tetrachloroethylene and trichloroethylene have been linked to cancer, and all have safer alternatives - either safer substances or alternative processes. Solvents are found in paints, glues, thinners, strippers, and lacquers used in construction, in wood finishing and in processed timbers.

Solvents Alternatives Guide (SAGE): http://sage.rti.org/altern.cfm. TURI website: www.turi.org <http://www.turi.org/> . CleanerSolutions database: www.cleanersolutions.org <http://www.cleanersolutions.org/> . TURI auto maintenance and repair webpage: http://www.turi.org/content/content/view/full/2683/.

ILO chemical safety webpages: http://www.ilo.org/public/english/protection/safework/chemsfty/index.htm

Mineral oils. In engineering, water-based alternatives or different work methods (eg. use of hot water/soap degreasing; alternative machining methods) are available to mineral oil based metalworking fluids (cutting oils; coolants). Where mineral oils are used, minimise exposures, through enclosing the job, proper planned maintenance and task redesign.

NYCOSH machine fluids webpages:
http://www.nycosh.org/specific_industries/manufacturing.html.
TURI website: www.turi.org <http://www.turi.org/> . CleanerSolutions database: www.cleanersolutions.org <http://www.cleanersolutions.org/> .

Wood dust. Reduce exposures through proper job design. Forward planning can ensure all machining is done in workshops with purpose designed exhaust ventilation and enclosures. In construction, most

machining should be completed before wood is brought on to site. Once on site, safe work methods and local exhaust ventilation on power tools should be used. Where all other methods are inappropriate, personal protective equipment should be provided. Disposable masks must be suitable and need be changed regularly. Exposures to dust from manufactured boards, medium density fibreboard (MDF), chipboards and plywood can present additional risks when machined. Dusts can be very fine and the dust is also contaminated with formaldehyde, which can cause cancer in humans. Timber used for construction is usually treated with pesticides, that is chemicals used to kill off insect or fungal infestations. The usual "nuisance dust" standard is not a safe standard for wood dust or wood-based board dust - mucociliary clearance (the body's defence mechanisms for removing dust from the airways) are overwhelmed at much lower dust exposures (2mg/m3). Lowest possible exposures should be sought.

BWI wood dust factsheet:
http://www.bwint.org/default.asp?Index=316&Language=EN
<http://www.bwint.org/default.asp?Index=316&Language=EN>

Diesel/vehicle exhaust fumes. Minimise exposures, for example use LGP or battery forklifts indoors. In tunneling work, technology exists to remove diesel exhaust fume and must be used. Avoid leaving vehicles idling - engines should be shut off or exhaust ventilation fixed to vehicle exhausts. Vehicles emitting exhaust fumes should not use used in enclosed spaces or spaces with limited ventilation.

CAW diesel exhaust factsheet: http://www.caw.ca/whatwedo/health&safety/factsheet/hsfssubstanceno11.asp <http://www.caw.ca/whatwedo/health&safety/factsheet/hsfssubstanceno11.asp> . USW Canada factsheet on reducing diesel emissions in mines: http://www.usw.ca/program/content/982.php. USWA diesel exhaust factsheet: http://www.uswa.ca/program/printthispage.php?pageid=983&lan=en <http://www.uswa.ca/program/printthispage.php?pageid=983&lan=en>

Solar radiation. Outdoor work presents a substantial occupational cancer risk as a result of exposure to sunlight (solar, non-ionising radiation). Schedule work so that outdoor work is minimised at the hottest parts of the day - for example, time breaks or indoor work for this time. Workers should be provided protection - high protection factor (SPF 30+) skin creams should be provided and applied frequently. All workers should have suitable work clothing; including hats, preferably with neck protection, and shirts and trousers with close-weave breathable fabrics

CCOHS UV radiation factsheet: http://ccohs.ca/oshanswers/phys_agents/ultravioletradiation.html . NYCOSH webpages on ionising and non-ionising radiation: http://www.nycosh.org/workplace_hazards/PhysicalHazards/radiation.html

Useful sources

Hazards cancer webpages: www.hazards.org/cancer <http://www.hazards.org/cancer>

New Jersey Department of Health listings of cancer causing substances, including factsheets on reducing exposure. http://web.doh.state.nj.us/rtkhsfs/factsheets.aspx?lan=english&alph=A&carcinogen=true&new=false <http://web.doh.state.nj.us/rtkhsfs/factsheets.aspx?lan=english&alph=A&carcinogen=true&new=false>

US National Toxicology Program Report on Carcinogens. http://ntp-server.niehs.nih.gov/index.cfm?objectid=72016262-BDB7-CEBA-FA60E922B18C2540

Lowell Center for Sustainable Production <http://www.sustainableproduction.org>

Prevent Cancer Coalition work and cancer webpages
<http://www.preventcancer.com/work/>

Chemicals Policy Initiative
<http://www.chemicalspolicy.org/home.shtml>

Canadian Strategy for Cancer Control <http://www.cancercontrol.org>

Toxics Use Reduction Institute (TURI) <http://www.turi.org>

The Collaborative on Health and the Environment
<http://www.healthandenvironment.org>

European Environmental Agency <http://www.eea.eu.int/main_html>

Women's Environmental Network
<http://www.wen.org.uk/health/index.htm>

Children's Environmental Health Network <http://www.cehn.org>

International Agency for Research on Cancer (IARC)
<http://www.iarc.fr>

International Society of Doctors for the Environment
<http://www.isde.org/>

Cancer Prevention and Education Society
<http://www.cancerpreventionsociety.org/>