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CARE
From HSE Department

*Message for Editorial Committee:*

*On behalf of editorial committee we are publishing this January-2021 edition of our newsletter. The main objective of this newsletter is to spread awareness on Health, Safety and Environment among the UPES and global community. The various activities of the department are also been added to promote the Safety activities. Department of HSE and Civil has taken various initiatives during the last semester they are published below. This newsletter is the outcome tireless efforts of students and faculties. We expect everyone to stand with us in achieving accident free environment.*

# Construction Hazards

As in other jobs, hazards for construction workers are typically of four classes: chemical, physical, biological and social.

**Chemical hazards**

Chemical hazards are often airborne and can appear as dusts, fumes, mists, vapours or gases; thus, exposure usually occurs by inhalation, although some airborne hazards may settle on and be absorbed through the intact skin. Chemical hazards also occur in liquid or semi-liquid state or as powders. Skin contact with chemicals in this state can occur in addition to possible inhalation of the vapour resulting in systemic poisoning or contact dermatitis. Chemicals might also be ingested with food or water, or might be inhaled by smoking. Several illnesses have been linked to the construction trades, among them:

- silicosis among sand blasters, tunnel builders and rock drill operators
- asbestosis among asbestos insulation workers, steam pipe fitters, building demolition workers and others
- bronchitis among welders
- skin allergies among masons and others who work with cement
- neurologic disorders among painters and others exposed to organic solvents and lead.

Elevated death rates from cancer of the lung and respiratory tree have been found among asbestos insulation workers, roofers, welders and some woodworkers. Lead poisoning occurs among bridge rehabilitation workers and painters, and heat stress among hazardous-waste clean-up workers and roofers. White finger appears among some jackhammer operators and other workers who use vibrating drills. Alcoholism and other alcohol-related disease is more frequent than expected among construction workers. Specific occupational causes have not been identified, but it is possible that it is related to stress resulting from lack of control over

employment prospects, heavy work demands or social isolation due to unstable working relationships.

**Physical hazards**

Physical hazards are present in every construction project. These hazards include noise, heat and cold, radiation, vibration and barometric pressure. Construction work often must be done in extreme heat or cold, in windy, rainy, snowy, or foggy weather or at night. Ionizing and non-ionizing radiation is encountered, as are extremes of barometric pressure. The machines that have transformed construction into an increasingly mechanized activity have also made it increasingly noisy. The sources of noise are engines of all kinds, winches, rivet guns, nail guns, paint guns, pneumatic hammers, power saws, sanders, routers, planers, explosives and many more. Noise is present on demolition projects by the very activity of demolition. It affects not only the person operating a noise-making machine, but all those close-by and not only causes noise-induced hearing loss, but also masks other sounds that are important for communication and for safety. Pneumatic hammers, many hand tools and earth-moving and other large mobile machines also subject workers to segmental and whole-body vibration. Heat and cold hazards arise primarily because a large portion of construction work is conducted while exposed to the weather, the principal source of heat and cold hazards. Roofers are exposed to the sun, often with no protection, and often must heat pots of tar, thus receiving both heavy radiant and convective heat loads in addition to metabolic heat from physical labour. Heavy equipment operators may sit beside a hot engine and work in an enclosed cab with windows and without ventilation. Those that work in an open cab with no roof have no protection from the sun. Workers in protective gear, such as that needed for removal of hazardous waste, may generate metabolic heat from hard physical labour and get little relief since they may be in an air-tight suit. A shortage of potable water or shade contributes to heat stress as well. Construction workers also work in especially cold conditions during the winter, with danger of frostbite and hypothermia and risk of slipping on ice.

**Biological hazards**

Biological hazards are presented by exposure to infectious micro-organisms, to toxic substances of biological origin or animal attacks. Excavation workers, for example, can develop histoplasmosis, an infection of the lung caused by a common soil fungus. Since there is constant change in the composition of the labour force on any one project, individual workers come in contact with other workers and, as a consequence, may become infected with contagious diseases—influenza or tuberculosis, for example. Workers may also be at risk of malaria, yellow fever or Lyme disease if work is conducted in areas where these organisms and their insect vectors are prevalent. Toxic substances of plant origin come from poison ivy, poison oak, poison sumac and nettles, all of which can cause skin eruptions. Some wood dusts are carcinogenic, and some are allergenic. Attacks by animals are rare but may occur whenever a construction project disturbs them or encroaches on their habitat. This could include wasps, hornets, fire ants, snakes and many others. Underwater workers may be at risk from attack by sharks or other fish.

**Social hazards**

Social hazards stem from the social organization of the industry. Employment is intermittent and constantly changing, and control over many aspects of employment is limited because construction activity is dependent on many factors over which construction workers have no control, such as the state of an economy or the weather. Because of the same factors, there can be intense pressure to become more productive. Since the workforce is constantly changing, and with it the hours and location of work, and many projects require living in work camps away from home and family, construction workers may lack stable and dependable networks of social support. Features of construction work such as heavy workload, limited control and limited social support are the very factors associated with increased stress in other industries. These hazards are not unique to any trade, but are common to all construction workers in one way or another.

# Ultraviolet Radiation

Like light, which is visible, ultraviolet radiation (UVR) is a form of optical radiation with shorter wavelengths and more energetic photons (particles of radiation) than its visible counterpart. Most light sources emit some UVR as well. UVR is present in sunlight and is also emitted from a large number of ultraviolet sources used in industry, science and medicine. Workers may encounter UVR in a wide variety of occupational settings. In some instances, at low ambient light levels, very intense near-ultraviolet sources can be seen, but normally UVR is invisible and must be detected by the glow of materials that fluoresce when illuminated by UVR. Just as light can be divided into colors which can be seen in a rainbow, UVR is subdivided and its components are commonly denoted as UVA, UVB and UVC. Wavelengths of light and UVR are generally expressed in nanometers (nm); 1 nm is one-billionth ($10^{-9}$) of a meter. UVC (very short-wavelength UVR) in sunlight is absorbed by the atmosphere and does not reach the Earth's surface. UVC is available only from artificial sources, such as germicidal lamps, which emit most of their energy at a single wavelength (254 nm) that is very effective in killing bacteria and viruses on a surface or in the air. UVB is the most biologically damaging UVR to the skin and eye, and although most of this energy (which is a component of sunlight) is absorbed by the atmosphere, it still produces sunburn and other biological effects. Long-wavelength UVR, UVA, is normally found in most lamp sources, and is also the

most intense UVR reaching the Earth. Although UVA can penetrate deeply into tissue, it is not as biologically damaging as UVB because the energies of individual photons are less than for UVB or UVC.

**Sources of Ultraviolet Radiation**

**Sunlight**

The greatest occupational exposure to UVR is experienced by outdoor workers under sunlight. The energy of solar radiation is greatly attenuated by the earth's ozone layer, limiting terrestrial UVR to wavelengths greater than 290-295 nm. The energy of the more dangerous short-wavelength (UVB) rays in sunlight is a strong function of the atmospheric slant path, and varies with the season and the time of day.

**Artificial sources**

The most significant artificial sources of human exposure include the following:

Industrial arc welding. The most significant source of potential UVR exposure is the radiant energy of arc-welding equipment. The levels of UVR around arc-welding equipment are very high, and acute injury to the eye and the skin can occur within three to ten minutes of exposure at close viewing distances of a few metres. Eye and skin protection is mandatory.

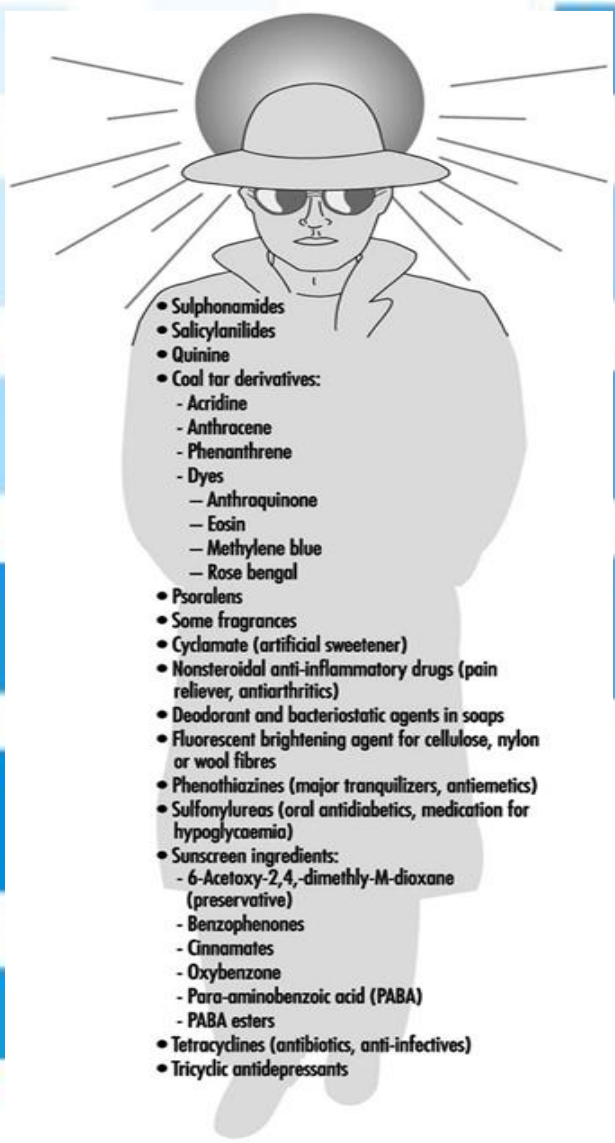
Industrial/workplace UVR lamps. Many industrial and commercial processes, such as photochemical curing of inks, paints and plastics, involve the use of lamps which strongly emit in the UV range. While the likelihood of harmful exposure is low due to shielding, in some cases accidental exposure can occur. "Black lights". Black lights are specialized lamps that emit predominantly in the UV range, and are generally used for non-destructive testing with fluorescent powders, for the authentication of banknotes and documents, and for special effects in advertising and discotheques. These lamps do not pose any significant exposure hazard to humans.

Medical treatment. UVR lamps are used in medicine for a variety of diagnostic and therapeutic purposes. UVA sources are normally used in diagnostic applications. Exposures to the patient vary considerably according to the type of treatment, and UV lamps used in dermatology require careful use by staff members. General lighting. Fluorescent lamps are common in the workplace and have been used in the home for a long time now. These lamps emit small amounts of UVR and contribute only a few percent to a person's annual UV exposure. Tungsten-halogen lamps are increasingly used in the home and in the workplace for a variety of lighting and display purposes. Unshielded halogen lamps can emit UVR levels sufficient to cause acute injury at short distances. The fitting of glass filters over these lamps should eliminate this hazard.

**Erythema**

Erythema, or "sunburn", is a reddening of the skin that normally appears in four to eight hours after exposure to UVR and gradually fades after a few days. Severe sunburn can involve blistering and peeling of the skin. UVB and UVC are both about 1,000 times more effective in causing erythema than UVA, but erythema produced by the longer UVB wavelengths is more severe and persists longer. The increased severity and time-course of the erythema results from

deeper penetration of these wavelengths into the epidermis. Maximum sensitivity of the skin apparently occurs at approximately 295 nm with much less sensitivity occurring at 315 nm and longer wavelengths.




**Delayed effects**

Chronic exposure to sunlight—especially the UVB component—accelerates the ageing of the skin and increases the risk of developing skin cancer. Several epidemiological studies have shown that the incidence of skin cancer is strongly correlated with latitude, altitude and sky cover, which correlate with UVR exposure. Exact quantitative dose-response relationships for human skin carcinogenesis have not yet been established, although fair-skinned individuals, particularly those of Celtic origin, are much more prone to develop skin cancer. Nevertheless, it must be noted that the UVR exposures necessary to elicit skin tumors in animal models may be delivered sufficiently slowly that erythema is not produced, and the relative effectiveness reported in those studies varies in the same way as sunburn.

**The eye**

Photokeratitis and photo conjunctivitis. These are acute inflammatory reactions resulting from exposure to UVB and UVC radiation which appear within a few hours of excessive exposure and normally resolved after one to two days.

**Retinal injury from bright light**

Although thermal injury to the retina from light sources is unlikely, photochemical damage can occur from exposure to sources rich in blue light. This can result in temporary or permanent reduction in vision. However the normal aversion response to bright light should prevent this occurrence unless a conscious effort is made to stare at bright light sources. The contribution of UVR to retinal injury is generally very small because absorption by the lens limits retinal exposure. (*Reference: www.iloencyclopaedia.org)*