ILO CONSTRUCTION OS&H

A free, comprehensive, international, digital training package in occupational safety and health for the construction industry

THEME SUMMARY 8: WELFARE AND PROJECT SITE

(Photo by Fiona Murie, BWI)

Summary of content
1. Preface
2. General principles of the design of site layout and facilities
3. Site facilities
4. Participative processes and procedures
5. Competence, training and induction
6. Relevant elements of the Knowledge Base

1 PREFACE

"Those concerned with the design and planning of a construction project shall take into account the safety and health of the construction workers in accordance with national laws, regulations and practice."

"National laws or regulations shall require that employers and self-employed persons have a duty to comply with the prescribed safety and health measures at the workplace."

(ILO C167 Safety and Health in Construction Convention, 1988)

This Theme is summarized under the headings given in the table above. No construction project site can be safe unless the layout and facilities are designed carefully and thoroughly, so this Theme Summary begins with a review of the factors to be considered and how the site should be planned, which is followed by an assessment of commonly required site facilities. The site will be 'home' to many people during their working hours, so all must have a say in the design and layout, so a section on participation has been included. Finally, the need for all involved to be suitably competent in their jobs is explained, together with some recommendations for training.

This Theme Summary is based mainly on the following sources of information:

- ILO C167 Safety and Health in Construction Convention, 1988 ('C167')
- The BWI web site: http://www.bwint.org ('BWI')
- ILO Code of Practice: Safety & health in construction ('ILO Code')
- ILO Safety, health and welfare on construction sites: a training manual ('ILO Manual')
- ILO Managing international construction projects: an overview ('ILO Overview')

For further information on these sources see relevant elements from the Knowledge Base, Section 6 below.

1. GENERAL PRINCIPLES OF THE DESIGN OF SITE LAYOUT AND FACILITIES

Careful and thorough design of the construction site layout and facilities lays the foundations for a safe and healthy project.

The following quotation is taken from the 'ILO Overview':

> The construction site is one of the primary resources available to the contractor. In fact the site becomes the "factory" for the production of the building project. The aim in planning site layout and facilities is to produce a working environment that will maximize efficiency and reflect the organization's attitude to the project, its commitment to the safety and well-being of the workforce and its determination to satisfy the needs of its customers. The planning and management of construction site layout and facilities should be given priority throughout the construction period. Concentrating on the efficient organization of the "construction factory" maximizes the benefits of innovative techniques such as prefabrication and automation in construction.
>
> Decisions made in the planning and management of construction site layout and facilities are critical to the successful completion of the project. Incorrect or ill-advised decisions prove costly, and lead to inefficient working, a demoralized workforce and a site that is unlikely to be safe or conducive to producing a high quality product. For example, the wrong choice of type or location for a tower crane may mean that, at worst, certain sections of the project cannot be built, or at least, may result in the necessity of hiring additional mobile craneage, double-handling of materials and so on.

The design of the site layout requires skill and experience and some of the factors that must be taken into account are as follows:

The size of the labour force required throughout the life of the project. This will usually vary significantly from start to finish, growing to a peak during the project before declining towards the finish; usually in the form shown in the diagram below.

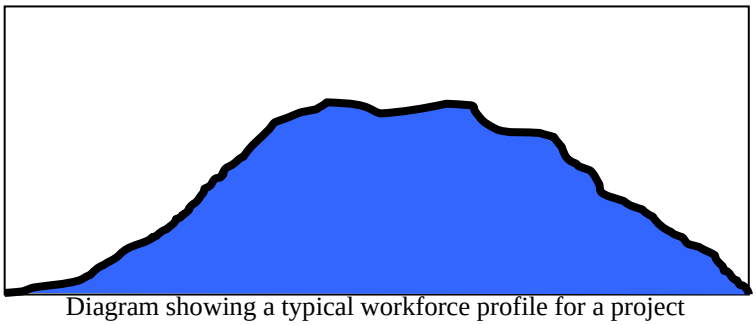


Diagram showing a typical workforce profile for a project

The type of labour force during the project. Consideration must be given to all the needs of the whole workforce: men, women, local residents or migrants requiring accommodation, physical characteristics, etc.

Facilities required by the workforce during the project. This will depend on many factors, including the location, climate, trades and tasks of the workforce, etc.

The changing nature of the work during the project. For example, a typical building project will start with excavation, so there will be a need to control mud and water, and to provide drying rooms for clothing, whereas at the finish most of the work will be inside. In addition, as the work progresses and the permanent works extend across the site, it may be necessary to change the layout and move the facilities.

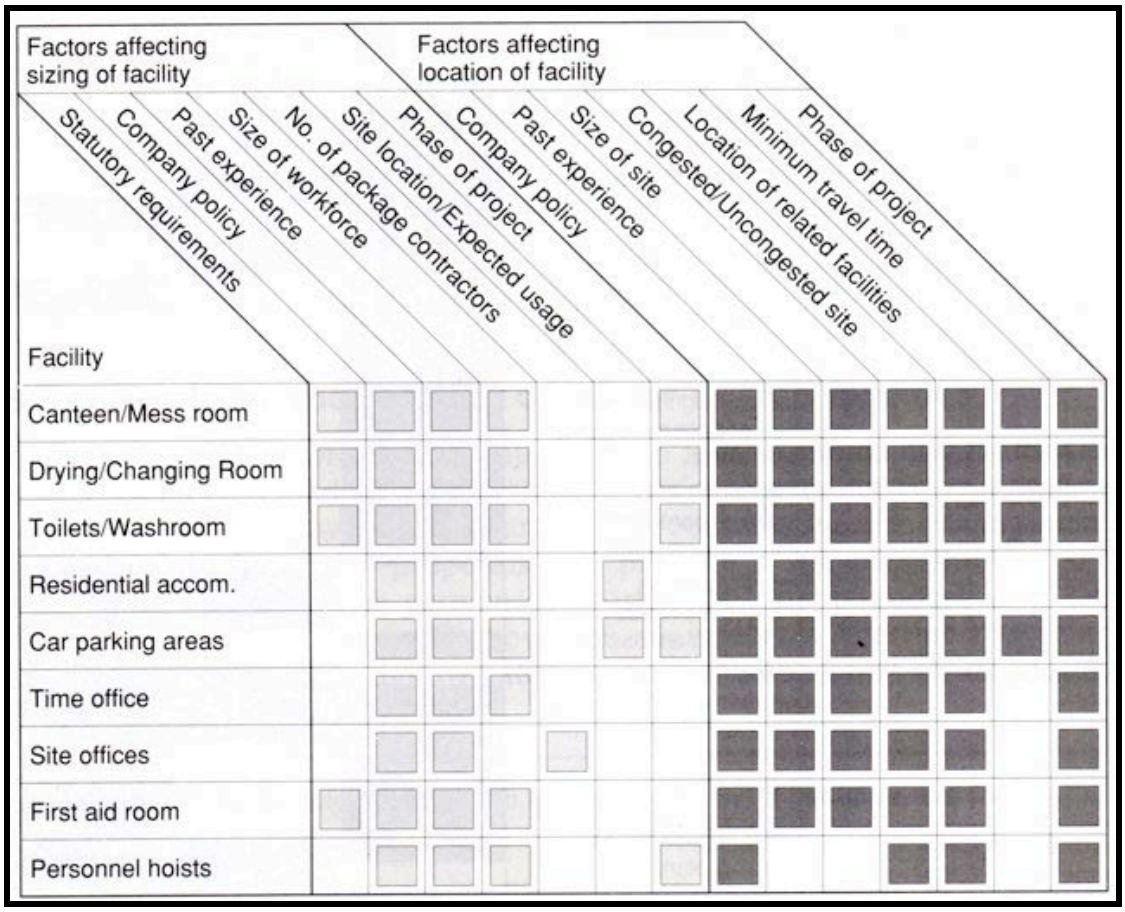
Access and transport for the workforce. Everyone on site must be able to come on to the site and move about safely.

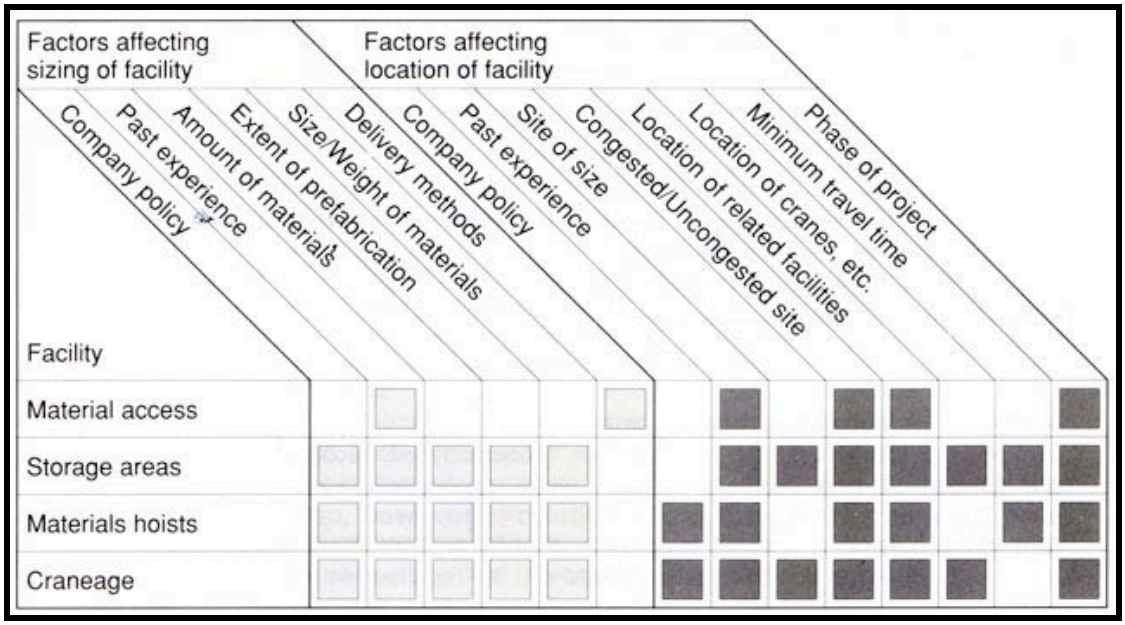
Delivery and storage of materials and components. This must be carefully planned and executed in a safe way.

Location and use of plant and equipment. The location and use of mechanised plant and equipment has major implications for OS&H. These are explained in other Theme Summaries, for example "General plant and equipment", "Vertical movement" and "Horizontal movement'.

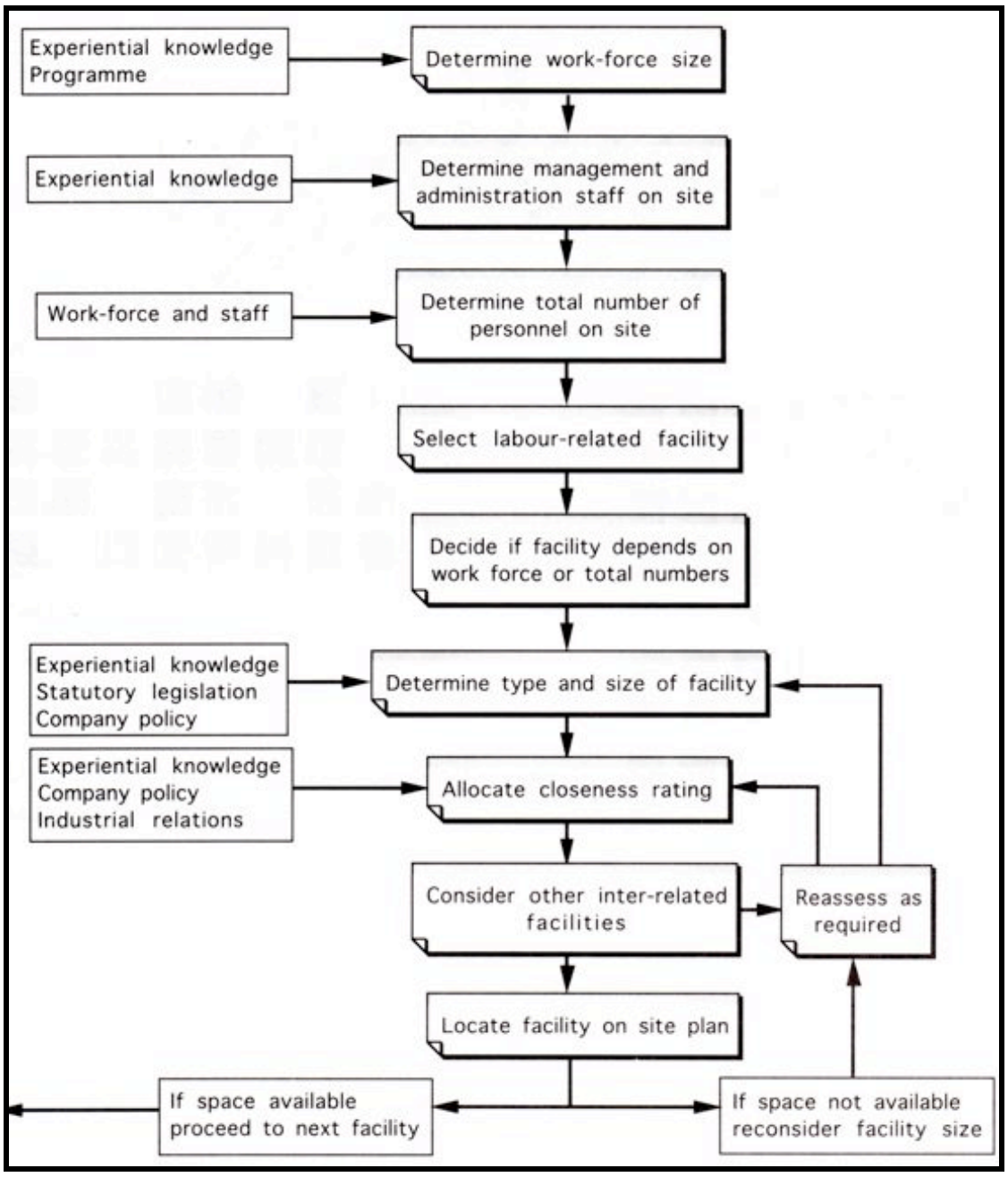
The real challenge in the design and management of site layout and facilities is to consider all these factors together. Construction sites can be very crowded places, with people, materials, components and machines all competing for space around and within the permanent works, which themselves are growing as the work progresses. The following diagrams provide a more detailed description of the facilities and factors to be considered, and provide a useful framework showing their interactions. They are taken from the ILO Overview.

Aspects of site layout and facilities		Primary resources affected		
Main aspect	Related items	Labour	Plant	Material
Safety	Signage	■		
	First aid	■		
	Access ways	■	■	
	Site cleanliness	■		■
	Lighting	■		
	Existing services	■	■	
	Fire prevention	■		■
Welfare	Canteen/mess rooms	■		
	Drying/changing rooms	■		
	Toilets/washrooms	■		
	Car parking/transport	■		
	Worker accommodation	■		
	Time office	■		
Offices	Major contractor	■		
	Package contractor	■		
	Client/design team	■		
Access	Delivery access		■	■
	Site access roads		■	■
	Pedestrian access	■		
Storage, etc.	Off-loading areas		■	■
	Long-term storage	■	■	■
	Workface storage	■		
	Tool storage	■		
	Secure stores	■		■
	Hazardous material store	■		■
	Prefabrication areas	■	■	■
	Batching plants	■	■	■
Transportation	Hoists	■	■	■
	Craneage		■	■
	Horizontal transportation		■	■
Rubbish removal	Site cleanliness	■	■	■
Temporary services	Electricity/gas/water	■	■	
	Drainage/surface water	■		
	Existing services	■	■	
Testing	On-site laboratories	■		■
Security	Hoarding/fencing	■		■
	Site access	■	■	■
	Secure stores	■		■
	Identification passes	■		
Image	Signage	■		
	Hoarding/fencing	■	■	■
	Site cleanliness	■	■	■
	Public relations	■		


Factors affecting sizing of facility
Factors affecting location of facility
Statutory requirements
Company policy
Past experience
Size of workforce
No. of package contractors
Site location/Expected usage
Phase of project
Company policy
Past experience
Size of site
Congested/Uncongested site
Location of related facilities
Minimum travel time
Phase of project
Facility
Canteen/Mess room
Drying/Changing Room
Toilets/Washroom
Residential accom.
Car parking areas
Time office
Site offices
First aid room
Personnel hoists


Factors affecting sizing of facility
Factors affecting location of facility
Company policy
Past experience
Amount of materials
Extent of prefabrication
Size/Weight of materials
Delivery methods
Company policy
Past experience
Site of size
Congested/Uncongested site
Location of related facilities
Location of cranes, etc.
Minimum travel time
Phase of project
Facility
Material access
Storage areas
Materials hoists
Craneage

The process of decision making for the labour aspects of site layout and facilities is illustrated by the following chart and example (ILO Overview).



Example **Sizing and locating the site canteen**

Determine workforce size:
Assume that peak workforce size is 500 and average is 350.

Determine management and administration staff numbers:
Assume a peak of 100 and average of 75.

Determine total number of personnel on site:
600 maximum, 425 average.

Select facility:
Site canteen. At this stage the manager must decide if the facility will cater for peak numbers or average numbers with alternative measures taken for the overflow at peak. Decide if facility size depends on workforce or total numbers: this will depend on whether staff and workforce will use the same canteen; custom varies in different countries.

Determine size of facility:
Plan area determined by seating requirements and allowance for catering, etc. Most countries have statutory legislation which refers to welfare accommodation. Most temporary units can be stacked and so reduce the area of site taken up, however circulation within the canteen area will be a priority and affect decisions to plan a split-level facility. It is also likely that the facility size can be reduced at the start and end of the project.

Allocate closeness rating:
At this stage the manager must decide the importance of this facility being close to the workface. This will obviously have an effect on other facilities and the closeness rating is a method of prioritizing the facilities with regard to location. For instance, the use of dispersed canteens located next to the workface may be considered to minimize workforce travel time at rest breaks. Local practice and industrial relations considerations will be influential here.

Consider other interrelated facilities:
At this stage the manager must relate the canteen to other facilities such as toilets, washrooms and site offices. Decisions on the canteen cannot be made in isolation. The size and closeness rating may need to be reconsidered due to the influence of the other facilities.

Locate facility on site plan:
Allocate the best space to the most important facility. The manager must decide the relative importance of the canteen. The size and closeness rating may need to be reconsidered once more. Avoid moving the canteen during the project unless absolutely essential.

3 SITE FACILITIES

Site layout

Following from the general design principles given in Section 2 above, the ILO Manual provides some good practical advice:

"A badly planned and untidy site is the underlying cause of many accidents resulting from falls of material and collisions between workers and plant or equipment. Space constraints, particularly in urban work sites, are nearly always the biggest limiting factor and a layout which caters best for the safety and health of workers may appear to be difficult to reconcile with productivity. Proper planning by management is an essential part of preparation and budgeting for the safe and efficient running of a construction operation.

Before work even begins on site, thought needs to be given to:

- *The sequence or order in which work will be done and to any especially hazardous operations or processes*

- *Access for workers on and around the site. Routes should be free from obstruction and from exposure to hazards such as falling materials, materials-handling equipment and vehicles. Suitable warning notices should be posted. Routes to and from welfare facilities need equal consideration. Edge protection will be required at the edge of floor openings and stairs, and wherever there is a drop of 2m or more*

- *Routes for vehicular traffic. These should be "one way" as far as practicable. Traffic congestion prejudices the safety of workers, especially when impatient drivers unload goods hurriedly*

- *Storage areas for materials and equipment. Materials need to be stored as close as possible to the appropriate workstation, e.g. sand and gravel close to the cement-batching plant, and timber close to the joinery shop. If this is not practicable, it is important to schedule the arrival of materials*

- *The location of construction machinery. This is usually dependent on operational requirements so that tower cranes are subject to constraints such as their radius of operation, and pick-up and unloading points. The objective should be to avoid the need to slew the load over workers*

- *The location of trade workshops – these are not usually moved after they are built*

- *The location of medical and welfare facilities. On large sites sanitary facilities for both sexes should be provided at several locations*

- *Artificial lighting at places where work continues or workers pass after dark*

- *Site security. The site should be fenced in to keep out unauthorized persons, children in particular, and to protect the public from site hazards. The type of fencing will depend on the location of the site, but in populated areas it should be at least 2m high and without gaps or holes. Overhead protection will be necessary if tower crane loads pass over public thoroughfares*

- *Arrangements to keep the site tidy and for the collection and removal of waste*

- *The need for low-voltage electric power supplies for temporary lighting, portable tools and equipment*

- *Training needs of both workers and supervisors*

Point to remember

The time spent on planning will make for a safer site and save money

Welfare

"Article 32 Welfare

1. At or within reasonable access of every construction site an adequate supply of wholesome drinking water shall be provided.

2. At or within reasonable access of every construction site, the following facilities shall, depending on the number of workers and the duration of the work, be provided and maintained-
(a) sanitary and washing facilities;
(b) facilities for changing and for the storage and drying of clothing;
(c) accommodation for taking meals and for taking shelter during interruption of work due to adverse weather conditions.

3. Men and women workers should be provided with separate sanitary and washing facilities."
(C167)

The ILO manual covers welfare very comprehensively, and the following is an edited extract. Some of the Articles from C167 are also included.

Work in the construction industry is arduous; it involves much manual or physical activity. It is also hazardous and dirty. Good welfare facilities not only improve workers' welfare but also enhance efficiency.

Welfare facilities such as the provision of drinking-water, washing, sanitary and changing accommodation, rest-rooms and shelter, facilities for preparing and eating meals, temporary housing, assistance in transport from place of residence to the work site and back, all help to reduce fatigue and improve workers' health. The facilities may

be provided and maintained by one contractor for all workers or by individual contractors.

Point to remember

Welfare facilities improve morale and consequently improve efficiency

Sanitary facilities

National laws usually prescribe the type, number and standard of sanitary facilities which should be provided, but as a general guide the following should be regarded as a practical minimum:

- A sufficient number of water flush-type lavatories for men when this is practicable, including sufficient urinal accommodation; chemical lavatories may be used otherwise
- A sufficient number of separate water flush-type lavatories for women when this is practicable; again, chemical lavatories may be an alternative
- The accommodation should be designed and constructed so as to screen the occupants from view and afford protection against the weather
- The accommodation should be separate from any messroom or rest-room
- A smooth and impermeable floor
- Effective natural and/or artificial lighting and ventilation
- At least 30m from any well
- Constructed for easy maintenance and cleaned out at least daily

(Photo by Fiona Murie, BWI)

Washing facilities

Work in the construction industry is often dusty and dirty; it may also involve handling chemicals and other dangerous substances, so employees need to wash their hands and bodies regularly:

- To prevent chemicals contaminating food and so being eaten during snacks or meals, being absorbed through the skin or being carried home
- To remove dirt and grime, which can also be ingested and cause sickness and disease
- As a basic hygiene measure

When construction work involves the maintenance of or alterations to existing buildings, it is often possible to use the facilities which form part of the building. Otherwise, washing facilities should be provided to the following standards:

- One wash-basin for every 15 workers with a sufficient supply of water and an adequate means of removing waste water.
- Soap, in the form of cake soap, or liquid or powder soap in a special dispenser, to facilitate quick and proper washing, nail-brushes are needed where hazardous substances are used.
- Suitable drying facilities such as paper towels, roller towels (or individual towels for each worker) or electric hand-dryers.
- For facilities likely to be of longer duration, mirrors and shelves at each washing point which will help to keep the place tidy and clean.
- Where workers are exposed to skin contamination by chemical substances or by oil or grease, a sufficient number of showers, which should be disinfected daily.
- Facilities should be covered to provide weather protection, and effectively ventilated and lit.

Facilities for supplying food and drink, and eating meals

(Photo by Fiona Murie, BWI)

Point to remember:

Drink water only from sources clearly marked as "drinking water"

Facilities for supplying food at construction work sites can be particularly important when sites are located in remote areas. Remoteness, together with inadequate temporary housing which lacks cooking facilities, may give rise to considerable problems for workers in the availability and regularity of hygienically prepared and nutritious meals. The problems of shift-workers may be even greater.

To meet the need for proper meals, a choice of facilities should be made available:

- Facilities to boil water and heat food
- Facilities (including provision of space, shelter, water, heating and rubbish bins) for vendors to sell hot and cold food and drink
- A canteen supplying cooked meals or serving packed meals, snacks and beverages
- Arrangements with a restaurant or canteen near the work site to supply packaged meals

There should be accommodation with tables and seats, protected from the weather, where workers can eat in comfort food brought from home or bought from vendors. It should be situated away from workstations to minimize contact with dirt, dust or dangerous substances.

Point to remember

Construction work is physically exhausting, and you need hygienically prepared and nutritious meals at regular times

Facilities for changing, storing and drying clothes

Secure facilities at the work site for changing from street clothes into work clothes, and for airing and drying the latter, greatly assist workers with their personal hygiene and tidiness and relieve them of anxiety over the security of their possessions.

(Photo by Fiona Murie, BWI)

Changing-rooms are particularly important when workers change from street clothes into protective clothing and when working clothes become wet or dirty. The facilities should include provision for drying wet clothes, whether it is street or working clothing. Separate changing facilities for men and women workers should be provided.

The provision of adequate seats, mirrors and rubbish bins in the changing rooms or close to the lockers will assist workers in paying attention to personal appearance and cleanliness.

(Photo by Fiona Murie, BWI)

Rest breaks

Construction workers begin work early. They start their day alert and productive but their activity level decreases as the day passes. Fatigue develops gradually before it begins to have marked effects. If they rest before they show signs of being really tired, recovery is much faster. Short breaks taken frequently are much better than infrequent long breaks. Productivity improves with frequent rest breaks.

National law may prescribe the length of a working day which includes a period or periods for rest breaks. At least one ten-minute break in the morning and one in the afternoon, in addition to a longer break for lunch, are essential.

Workers are not just idle during rest breaks, but are recovering from fatigue and preparing for continued productive work. Getting away from a noisy or polluted workplace helps workers to relax and recover from fatigue, and an area with seating and out of direct sunlight should be set aside for rest breaks.

Point to remember

Breaks which are short and taken often are better than long breaks taken infrequently

Child-care facilities

Working mothers employed at construction sites often need help with the special difficulties of caring for their children while they are at work. Basic provisions are summarised below.

A clean and well-ventilated room, preferably with access to an enclosed space, is the main facility needed. A few items of simple furniture are necessary for the children to sit or lie down, and some toys help. There should be provision for feeding the children with nutritious meals at regular times and, for this, there should also be access to cooking facilities or a canteen.

It is essential for someone to care for the children while their mothers are at work, prepare their meals and feed them regularly. It may be possible for mothers themselves to take turns to look after the children. Mothers, especially nursing mothers, should be able to visit their children during recognized breaks from work.

It is essential to watch the children's movements. Each year there are many tragic deaths of children on construction sites. Children should never be allowed to wander into or play on sites. There are excavations to fall into, scaffolding to fall from and hazardous equipment.

Welfare facilities and women workers

The following extract is taken from a study in the USA by the Occupational Safety and Health Administration (OSHA) (osha.gov): Women in the Construction Workplace: Providing Equitable Safety and Health Protection. It tells a story of a fundamental problem that could be found on construction sites in many countries in the world, and must be resolved by international action.

Access to sanitary facilities is frequently a problem on a new construction site. Temporary facilities are usually unisex, often without privacy, and generally not very well maintained. Sometimes there are no sanitary facilities available for women to use. Due to the lack of facilities, women report that they avoid drinking water on the job, risking heat stress and other health problems. Courts have found that the lack of appropriate sanitary facilities is discriminatory and violates OSHA standards.

Unclean facilities can result in disease as well as urinary tract infection (for those who delay urinating rather than using such facilities). The availability and cleanliness of restroom facilities are major concerns for tradeswomen. Thirty-five percent of the women in the second NIOSH survey answered "false" to the statement, "There are clean toilets at most jobsites."

Inadequate, unsanitary toilet facilities were the subject of a 1987 U.S. Appeals Court decision. Eileen Lynch, a female carpenter apprentice with the Tennessee Valley Authority (TVA), was fired for using the large, clean, fully-equipped restrooms in the main building of the plant, which was off limits to construction personnel. She used these restrooms occasionally after her doctor diagnosed her with a bladder infection. Some of the men she worked with used them regularly and were not disciplined. The construction site contained two portable toilets for women, one at each end of the work area, and 21 other portable toilets not designated by sex, but primarily used by men.

The portable toilets were dirty, often had no toilet paper or paper that was soiled, and were not equipped with running water or sanitary napkins. In addition, those designated for women had no locks or bolts on the doors and one of them had a hole punched in the side. To avoid using the toilets, Ms. Lynch began holding her urine until she left work. Within three days after starting work she experienced pain and was advised that the practice she had adopted, as well as using contaminated toilet paper, frequently caused bladder infections.

The Appeals Court ruled that the condition of the toilets limited female Construction Service Branch employees in a way that adversely affected their status as employees based solely on their sex. It held that any employment practice that adversely affects the health of female employees, while leaving male employees unaffected, has a significantly discriminatory impact.

(The ILO is grateful to OSHA for the use of this quotation. It is 390 words long, so has been used under the convention of 'Fair Use' which allows a maximum of 400 words to be used without seeking formal permission.)

For the full report see: http://www.osha.gov/doc/accsh/haswicformal.html

First aid and general medical facilities

The following extract is from ILO C167.

Article 31 First aid
The employer shall be responsible for ensuring that first aid, including trained personnel, is available at all times. Arrangements shall be made for ensuring the removal for medical attention of workers who have suffered an accident or sudden illness.

Construction sites are dangerous places, and first-aid and rescue equipment should always be available. What is needed will depend on the size of the site and the numbers employed, but there should be at least a stocked first-aid box and a stretcher and blanket – the stretcher should be of a type which can be raised and lowered to and from upper floors. On large sites, and always where more than 200 people are employed, there should be a properly equipped first-aid room or hut. Ideally, large sites would have a well-stocked medical facility and properly trained staff. These would support general welfare as well as providing an emergency service. On any construction site of any size, at least one person on every shift should have been trained in first aid to a nationally recognized standard.

(Photo by Fiona Murie, BWI)

Fire precautions

Fires on construction sites arise from the misuse of compressed gases and highly flammable liquids, from the ignition of waste material, wood shavings and cellular plastic materials, and from the failure to recognize that adhesives and some floor and wall coatings are highly flammable.

Every individual on site should be aware of fire risks, and should know the precautions to prevent a fire and the action to be taken if fire does break out.

4 PARTICIPATIVE PROCESSES AND PROCEDURES

"Article 6
Measures shall be taken to ensure that there is co-operation between employers and workers, in accordance with arrangements to be defined by national laws or regulations, in order to promote safety and health at construction sites."

"Article 10
National laws or regulations shall provide that workers shall have the right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on the working procedures adopted as they may affect safety and health."
(C167)

Safety committees

An active safety committee is a great spur to safety. Its primary purpose is to enable management and workers to work together to monitor the site safety plan so as to prevent accidents and improve working conditions on site. Its size and membership will depend on the size and nature of the site and upon differing legal and social conditions in the countries concerned, but it should always be an action-oriented group of people in which both management and workers are represented. The safety committee carrying out a site inspection together raises the level of safety consciousness at the site. The duties carried out by an active safety committee will include:

- Regular and frequent meetings to discuss the safety and health programme on site and to make recommendations to management
- Consideration of reports of safety personnel
- Discussion of accident and illness reports in order to make recommendations for prevention
- Evaluating improvements made
- Examination of suggestions made by workers, particularly by safety representatives
- Planning and taking part in educational and training programmes, and information sessions

(ILO Manual)

Safety representatives

These are appointed by workers, sometimes in accordance with national legislation, to represent them in dealing with safety and health matters on site. They should be experienced workers well able to recognize construction site hazards, although they are likely to require training to acquire new skills in inspection and in using information. Their functions are to:

- Make representations to management about matters of concern regarding the safety and health of workers
- Attend meetings of the safety committee
- Carry out regular and systematic inspections on site
- Investigate accidents in conjunction with management to determine their causes and to propose remedies
- Investigate complaints by fellow workers
- Represent workers in discussions with government inspectors at their site visits

(ILO Manual)

5 COMPETENCE, TRAINING AND INDUCTION

Article 3 Information and training
Workers shall be adequately and suitably-

(a) informed of potential safety and health hazards to which they may be exposed at their workplace;

(b) instructed and trained in the measures available for the prevention and control of, and protection against, those hazards.

(C167)

20.2. No person should be employed in any work at a construction site unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programmes to enable all the workers to read and understand the information and instructions related to safety and health matters.

20.3. The information, instruction and training should be given in a language understood by the worker and written, oral, visual and participative approaches should be used to ensure that the worker has assimilated the material.

20.4. National laws or regulations should prescribe:

(a) the nature and length of training or retraining required for various categories of workers employed in construction projects;

(b) that the employer has the duty to set up appropriate training schemes or arrange to train or retrain various categories of workers.

20.5. Every worker should receive instruction and training regarding the general safety and health measures common to the construction site, which should include:

(a) general rights and duties of workers at the construction site;

(b) means of access and egress both during normal working and in an emergency;

(c) measures for good housekeeping;

(d) location and proper use of welfare amenities and first-aid facilities provided in

pursuance of the relevant provisions of this code;
(e) proper use and care of the items of personal protective equipment and protective clothing provided to the worker;
(f) general measures for personal hygiene and health protection;
(g) fire precautions to be taken;
(h) action to be taken in case of an emergency;
(i) requirements of relevant safety and health rules and regulations.

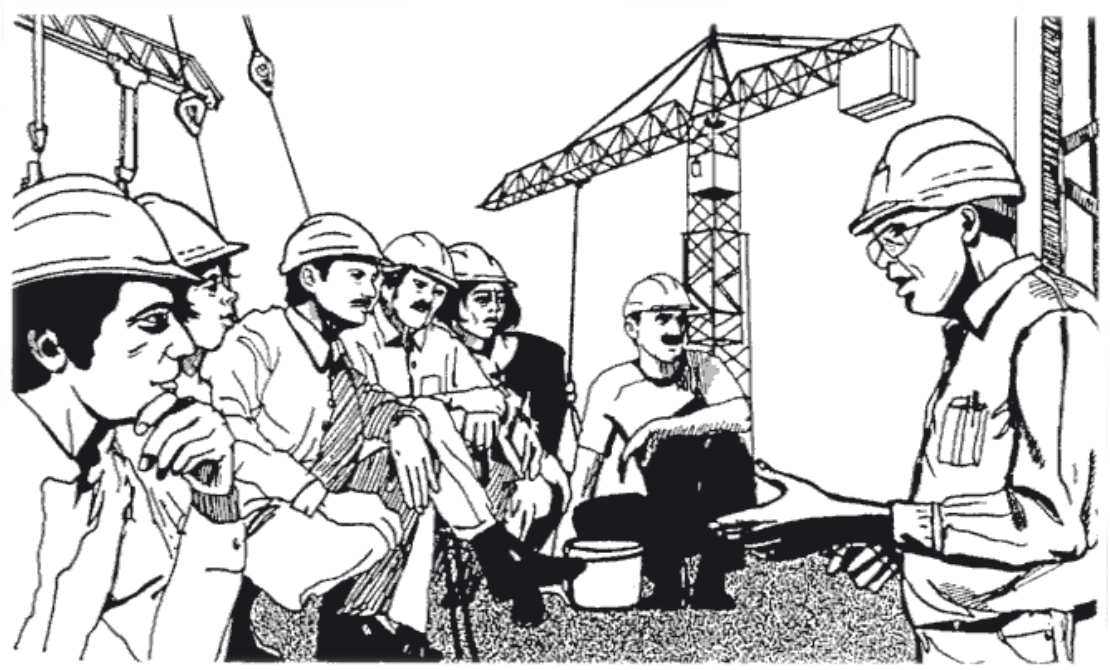
20.6. Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

20.7. Specialised instruction and training should be given to:
(a) drivers and operators of lifting appliances, transport vehicles, earth-moving and materials-handling equipment and plant, and machinery or equipment of a specialised or dangerous nature;
(b) workers engaged in the erection or dismantling of scaffolds;
(c) workers engaged in excavations deep enough to cause danger, or shafts, earthworks, underground works or tunnels;
(d) workers handling explosives or engaged in blasting operations;
(e) workers engaged in pile-driving;
(f) workers working in compressed air, cofferdams and caissons;
(g) workers engaged in the erection of prefabricated parts or steel structural frames and tall chimneys, and in concrete work, formwork and such other work;
(h) workers handling hazardous substances;
(i) workers working as signallers;
(j) other specialised categories of workers.

20.8. Wherever required by national laws and regulations, only drivers, operators or attendants holding a certificate of proficiency or licence should be employed to operate particular vehicles, lifting appliances, boilers or other equipment.

(C167)

"Tool-box briefing" should be carried out regularly



(ILO Manual)

Induction

Induction to the project site and the way it operates is of crucial importance to those who work on the site, but also to visitors – who will include the Client's representatives and also many of the others involved in the project.

No person should be allowed onto the construction site unless they have completed the induction training or they are accompanied at all times by a 'competent' person', who will of course have been through the induction training.

An excellent PowerPoint Presentation is provided with **Construct OS&H**. It is taken from "Construction safety management" by Howarth and Watson (See relevant elements from the Knowledge Base, Section 6 below).

6 Relevant elements of the Knowledge Base

Title	C167 Safety and Health in Construction Convention, 1988
Author(s)	The General Conference of the International Labour Organisation
Type of source	ILO Convention concerning Safety and Health in Construction
Publication or other source details	Convention: C167 Place: Geneva Session of the Conference: 75
Date & ISBN/ISSN	Date of adoption: 20:06:1988 Date of coming into force: 11:01:1991
Summary of contents	I. Scope and definitions II. General provisions III. Preventive and protective measures IV. Implementation V. Final provisions There are also some useful cross-references at the end.
Comments on relevance	The core document for **Construction OS&H**, containing fundamental general provisions and much detailed guidance**.**
Other information	This Convention has very similar detailed content to the ILO's Code of Practice, 1992, which is also summarised in this Knowledge Base.

Title	BWI web site
Type of source	Web site
Publication or other source details	http://www.bwint.org and refer to the 'Building and Construction' button on the left
Date & ISBN/ISSN	Accessed December 2008
Summary of contents	The first page in the Building and Construction section has a very good summary of the characteristics and employment issues of these industries, and sets out BWI's views: "For the BWI, the most effective way to ensure that worker's interests are protected in the work place is through legislation and regulation. In this connection, we work with the International Labour Organization (ILO) to lobby for the implementation of ILO standards and their respect in World Bank agreements. We promote the social dimension of sustainable development in economic growth, environmental conservation and society since it will not make construction more expensive. For example, a good working environment reduces the risks of heavy physically demanding work, leads to fewer accidents at work, fewer sick days and thus shorter times and lower costs for the total construction." There are many interesting and relevant articles, especially concerned with women workers with some excellent photos of women at work.
Comments on relevance	There is much in this site of general relevance, and the photos can be downloaded and used in training materials.
Other information	See other BWI source summaries

Title	ILO Code of Practice: Safety & health in construction
Type of source	Code of practice, 174 pages
Publication or other source details	ILO Publications http://www.ilo.org/global/Publications
Date & ISBN/ISSN	1992. 92-2-107104-9
Summary of contents	*"It goes a long way in mapping out the agenda for health and safety professionals in this most dangerous and populous industry."* Content: 1. General provisions 2. General duties 3. Safety of workplaces 4. Scaffolds and ladders 5. Lifting appliances and gear 6. Transport, earth-moving and materials-handling equipment 7. Plant, machinery, equipment and hand tools 8. Work at heights including roof work 9. Excavations, shafts, earthworks, underground works and tunnels 10. Cofferdams and caissons and work in compressed air 11. Structural frames, formwork and concrete work 12. Pile-driving 13. Work over water 14. Demolition 15. Electricity 16. Explosives 17. Health hazards, first aid and occupational health services 18. Personal protective equipment and protective clothing 19. Welfare
Comments on relevance	This Code of Practice is fundamental to this training package. It has influenced the structure and informed the content.
Other information	Downloaded as "ILO Code of Practice"

Title	ILO Safety, health and welfare on construction sites A training manual
Author(s)	ILO
Type of source	Training manual, 134 pages
Publication or other source details	ILO Geneva, International Labour Office Can be downloaded from: http://www.ilo.org/public/english/protection/safework/training/english/download/architecture.pdf
Date & ISBN/ISSN	1995. ISBN 92-2-109182-1
Summary of contents	Preface 1. Introduction 2. Safety organization and management 3. Site planning and layout 4. Excavations 5. Scaffolding 6. Ladders 7. Hazardous processes 8. Vehicles 9. Movement of materials 10. Working positions, tools and equipment 11. The working environment 12. Personal protective equipment (PPE) 13. Welfare facilities Annexes 1. Safety, health and welfare on construction sites: Check-list 2. The Safety and Health in Construction Convention, 1988 (No. 167), and Recommendation, 1988 (No175)
Comments on relevance	This is a comprehensive manual, which follows the contents of ILO C167 very closely. Extracts have been used in Construct OS&H, especially in the technical sections.
Other information	It has been Downloaded as ILO Safety, health and welfare on construction sites: A training manual

Title	Managing international construction projects: an overview
Author(s)	R Neale (Ed)
Type of source	Book, 239 pages
Publication or other source details	International Labour Office, Geneva. International construction management series No 7
Date & ISBN/ISSN	1995. 92-2-108751-4 & 4020-0142
Summary of contents	An edited book with contributions from Richard Neale, Williams Sher, Alistair Gibb and Simon Barber Chapters 1: Construction project management 2: Project management organisation 3: System support for projects 4: Control of quality and quality assurance 5: Site layout and facilities 6: Key considerations for site layout and facility planning 7: Construction site safety 8: Planning case studies 9: Cost analysis case study
Comments on relevance	A useful but very general book, apart from the case studies which are quite detailed. This is the last book (No7) in the series so some detailed case studies were seen to be useful. The planning case study has been adapted to provide an integrative project on OS&H for **Construction OS&H**
Other information	See Tutor's Guide for more on the content of this book.

Title	Construction safety management
Type of source	Book and PowerPoint Presentation
Publication or other source details	Tim Howarth, Paul Watson Paperback, 216 pages, Wiley-Blackwell http://eu.wiley.com/WileyCDA
Date & ISBN/ISSN	2008. ISBN: 978-1-4051-8660-5
Summary of contents	An up-to-date textbook on the subject. Very oriented towards being used in an educational course, contains exercises and questions. The web site offers a PowerPoint Presentation on site induction and self-assessment questions. Contents: Introduction: Health and Safety – Overriding Principles. Chapter 1 The Safety Performance of the UK Construction Industry. Chapter 2 The Legal Framework and Enforcement of Construction Health and Safety. Statutory Instruments. Chapter 3 UK Construction Health and Safety Law. Chapter 4 The Construction (Design and Management) Regulations 2007. Chapter 5 Key Site Health and Safety Hazards and Control Measures. Chapter 6 Principles and Practice of Health and Chapter 7 Managing for Health and Wellbeing. Chapter 8 The (Principal) Contractor's Health and Safety Management System. Chapter 9 Promoting a Positive Health and Safety Culture.
Comments on relevance	Entirely based in a UK context, but contains generally useful materials.

Title	Women in the Construction Workplace: Providing Equitable Safety and Health Protection
Author(s)	Advisory Committee on Construction Safety and Health (ACCSH), Department of Labor, US Government
Type of source	Report on web site
Publication or other source details	Health and Safety of Women in Construction (HASWIC) workgroup Occupational Safety & Health Administration 200 Constitution Avenue, NW Washington, DC 20210 www.osha.gov
Date & ISBN/ISSN	March 13, 1997
Summary of contents	As increasing numbers of women enter the construction trades, concerns about their health and safety are growing. In addition to the primary safety and health hazards faced by all construction workers, there are safety and health issues specific to female construction workers. The small percentage of females within the construction trades and the serious health and safety problems unique to female construction workers have a circular effect. Safety and health problems in construction create barriers to women entering and remaining in this field. In turn, the small numbers of women workers on construction worksites foster an environment in which these safety and health problems arise or continue. Sources of information for this report include a survey of tradeswomen conducted by CWIT and two research studies by NIOSH. The key findings and recommendations are organized into seven categories: Workplace Culture; Sanitary Facilities; Personal Protective Equipment; Ergonomics; Reproductive Hazards; Health and Safety Training; and Injury and Illness Data and Research. Similar concerns surfaced in all three studies. The prevalence of a hostile workplace, restricted access to sanitary toilets, protective clothing and equipment in the wrong sizes, and poor on-the-job training; these were significant issues that adversely impacted women's ability to perform their jobs safely. Many of the identified problems are amenable to change through engineering, behavioral, or administrative intervention. The recommendations in this report are directed at employers, labor unions, manufacturers, training programs, supervisors, and workers. Improving the work conditions for women in the construction trades will not only ensure their health and safety, it will also serve to attract and retain women as workers during a critical time of labor shortages in this industry.
Comments on relevance	Particularly relevant to Themes 3, 7, 8 & 14