

# AIR RAID PRECAUTIONS FOR INDUSTRIAL AND BUSINESS PREMISES



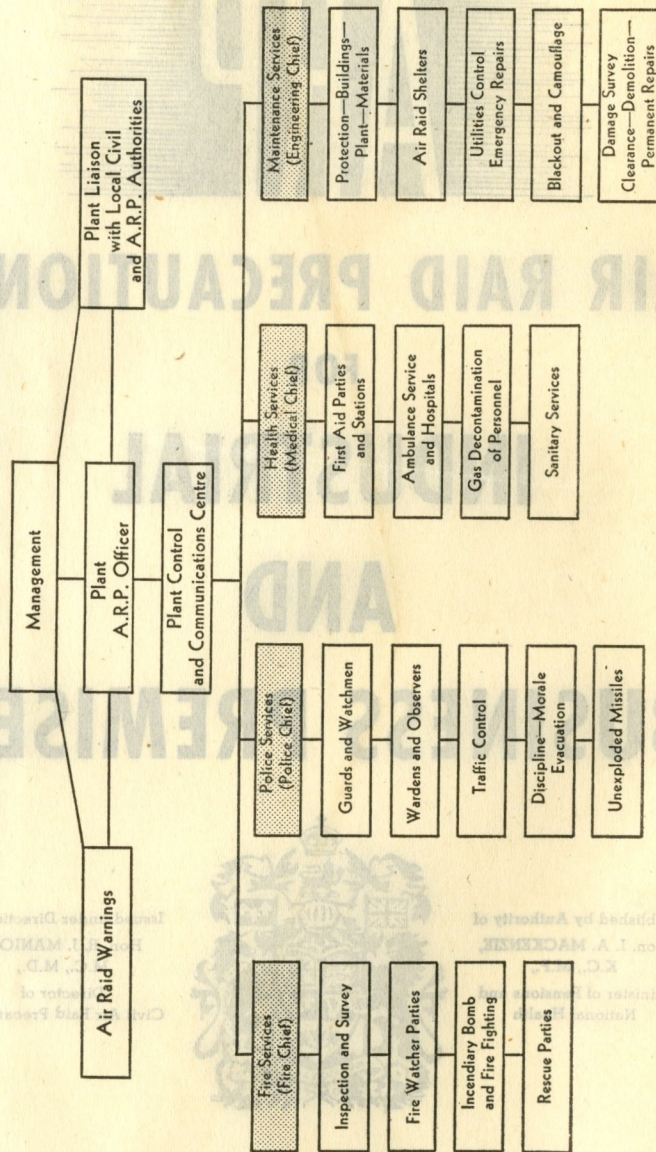
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## INDUSTRIAL PLANT ARP ORGANIZATION



## CANADIAN INDUSTRY GOES TO WAR

IN the two and a half years during which Canada has been at war, Canadian Industry has wrought a miracle. The change over from peacetime to wartime production, the tremendous industrial expansion, the recruiting and training of hundreds of thousands of new workers, all these go to make up a page in the history of Canadian Industry which will long remain as an unparalleled record of accomplishment.

### A New Challenge to Canadian Industry

Now, with the threat of enemy action from the air against our land, a new responsibility of extreme importance and urgency is laid upon the management of Canadian Industry and Business.

This new responsibility may be briefly set down under these four headings:

- (a) Protection of your workers against death or injury from enemy action.
- (b) Protection of your property.
- (c) Protection of vital stores of materials and finished products.
- (d) Continuance, as far as safety permits, of uninterrupted production.

### Expansion of Protective Services

Basically these four objectives must be achieved by the expansion and adjustment of the regularly existing facilities. Your present Accident Prevention, First Aid, and Fire Protection Services, as well as Plant Inspection and Protective Organization will be the root from which your Air Raid Precautions Organization will grow. The responsibilities regarding Air Raid Precautions in industrial and commercial plants must rest with the management of each plant. The purpose of this booklet is

merely to set forth certain guiding principles to assist in your study and planning. These suggestions are based on actual experience under Air Raid conditions—the experience of Britain in the "Amazing Summer" of 1940.

To assist in your deliberations along these lines there are listed here the various divisions of organization which should be provided and to head each of which some responsible key man of organizing ability and leadership should be appointed at once.

- (a) Blackout Requirements.
- (b) Warnings and Communication Systems.
- (c) Protection of Personnel—Refuges and Shelters.
- (d) Protection of Property.
- (d) Fire Watchers' Group.
- (f) Auxiliary Fire Service.
- (g) First Aid Posts.
- (h) Clearance and Repair Groups.

## **B** } **WHAT IS TO BE EXPECTED**

WHILE enemy action from the air may include attack with heavy high explosive bombs, gas and incendiary bombs, for the present at least, the greatest potential danger is from the incendiary bomb. Gas attacks have, as yet, not been attempted. It is hardly possible that Canada would be made a testing ground.

Raiding planes working from distant bases, or from aircraft carriers, are definitely limited as to load weight. High explosive bombs weigh 500 to 3,000 pounds apiece. A plane can carry but a few. While their results are devastating, they are usually limited to the immediate area of explosion.

A similar weight of incendiary bombs—weighing from 2 to 50 pounds each—may be scattered over a wide area. The fires so started, unless skilfully dealt with, might grow to staggering proportions. The fire started by an incendiary bomb is always infinitely more important than the bomb itself.

Very little can be done to protect any plant or building from a direct hit by a high explosive bomb. Effective steps can and should be taken to provide protection against the effects of blast and bomb fragments. Suitable refuges must be provided for the protection of personnel, but organization to deal with the danger from incendiary bombs will, for the present at least, be the matter requiring most of your planning and attention.

Incendiary bombs are designed to pierce any ordinary roof and so the fire resulting usually must be dealt with on the upper storey or in "under-roof" spaces which are frequently difficult to get at.

## **C** } **SUGGESTED ORGANIZATION**

THE organization chart in the front of this booklet will suggest the basis of the A.R.P. Organization to be set up for your plant.

The Plant Superintendent or Production Manager will probably be chosen as Chief A.R.P. Officer of the plant. He will work under direct authority of, and with direct responsibility to, the Management. He will be the point of contact with the local A.R.P. Organization, and with the local Fire, Police, Health and other Services. Close co-operation with these outside sources of information and assistance is important at all times.

The four divisions of the A.R.P. Organization suggested, in most cases will be headed by the member of the staff normally in charge of such services in peacetime. Each will develop and enlarge his personnel and equipment to suit the new conditions.

In planning the expansion of these services, the following paragraphs will serve as guiding principles.

## **D** } **BLACKOUT REQUIREMENTS**

PREVENTION is better than cure. The Blackout is essentially a prevention measure. Its purpose is twofold: first, to make it as difficult as possible for raiding aircraft to locate their objectives and, secondly, to remove as far as possible any evidence of large buildings which might be selected as "alternative targets" by raiders. Thus, the effectiveness of your Blackout arrangements is vital not only to the protection of your own plant but—lest you furnish a landmark for the guidance of raiders—an important link in the protection of the community as a whole.

In the case of internal lights, the question should be investigated as to how far complete invisibility from outside can be secured by the darkening of windows and skylights. For Blackout efficiency, all windows, skylights and glazed doors would have to be rendered opaque at night, either by the use of paint covering the whole window, by the fitting of blinds, or by a combination of both methods. Blinds under skylights, if sufficiently strong, would serve also to prevent the fall of glass in the event of a skylight being shattered by the explosion of a bomb.

It is important that such steps as are practicable should be taken to make less easy the identification of objectives by day, as well as by night. Accordingly arrangements should be made to remove or screen any signs on the roofs of buildings which might give any indication of the identity of the premises.

All outside lights must be turned off as soon as the Air Raid warning sounds. A single control switch for this purpose is recommended.

Arrangements should be made to have roads and pathways marked by white posts or stones or by white-wash, for the convenience of those who use them in a Blackout.

## **E** } **WARNINGS AND COMMUNICATIONS**

TRAINED observers, equipped with modern scientific detectors, are strategically placed to observe the movement of hostile aircraft, to plot their course and issue warnings when an attack is imminent. While warning will be given as far in advance of actual attack as possible, there is no guarantee of how much time will elapse between warning and actual attack.

Time is the essence of the matter and when warning of an air raid is received, not a second should be lost in putting your protective plans into operation.

In special cases, a confidential warning may be communicated in advance of the public warning, but normally you must rely on the warning issued to the public in the vicinity. In all large industrial plants, especially those engaged on war production or work involving special risks, it is desirable to arrange with the local A.R.P. Chief Warden for confidential warnings to be given as far in advance of public warnings as practical.

The exact form of the public warning signal will be settled in each district by the local authority. The management should make the necessary arrangements to ensure that, on receipt of an air raid warning, it is conveyed to the workpeople. It will often be desirable to plan means for conveying the warning to the selected A.R.P. personnel who have to take some preliminary action, before it is issued generally.

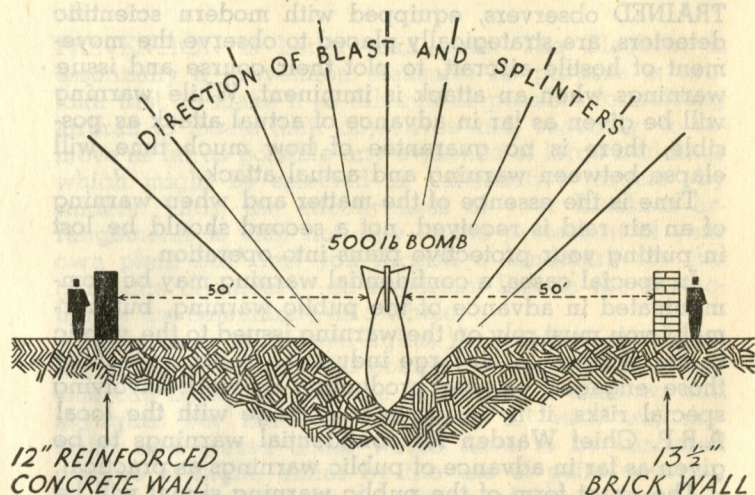
On the departure of the raiders, a further signal will be given: and arrangements will be needed for conveying this signal to all in the works, whether in refuges or elsewhere.

### **Emergency Communications.**

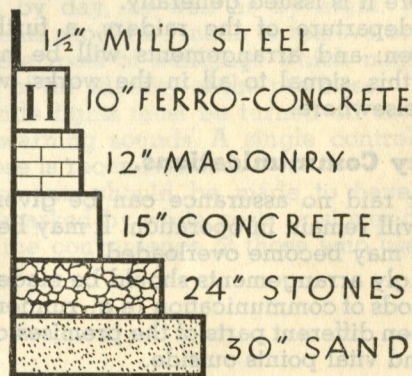
In an air raid no assurance can be given that the telephone will remain in operation. It may be damaged or the lines may become overloaded.

Accordingly arrangements should be made for emergency methods of communication (e.g., runners, cyclists, etc.,) between different parts of the premises or between the plant and vital points outside.

## PROTECTION AGAINST SPLINTERS



### Thickness of Materials Safe against Splinters



## F PROTECTION OF PERSONNEL

SINCE normally it would be impracticable to provide effective protection against direct hits by high explosive bombs, the arrangements to be made should be designed to ensure protection against blast, splinters and gas. In many cases it may be impossible to make large factory or business premises completely safe against gas and splinters and it will be necessary to select suitable places which can be adapted as shelters, to which workers and others could go on receipt of an air raid warning.

On the opposite page there is given in sketch and chart form information which will be of general guidance in planning the steps to be taken adequately to protect the locations adopted as shelters against bomb splinters and blast.

The question of gas-proofing such shelters is a matter requiring too much technical information for the scope of this booklet and will be dealt with in separate publications on the subject of War Gases.

In selecting places of Refuge or Shelter, it is important to avoid concentration of large numbers of persons in one place. A number of smaller Refuges located at various points minimizes the danger of serious results from a direct hit or from blast or flying fragments.

As a general rule, accommodation below ground level is best, unless there is any real danger of flooding and provided ample exits are available or can be arranged. If suitable accommodation below ground level is not available, then the ground floor is likely to be the most satisfactory location. The walls and roof of a shelter should be of sound construction.

No shelter should be located below heavy machinery, water tanks, or below any structure which might collapse and demolish it.

No shelter should be near stores of inflammable material. Proximity to boilers or to numbers of hot pipes should also be avoided, as high temperatures in a shelter are undesirable.

If the shelter has windows, these will require suitable protection against flying splinters and blast.

An internal corridor may form a good shelter, especially if it can be closed at both ends for protection against gas if and when necessary.

A reasonable amount of crowding in a Refuge is no great disadvantage, but there should always be room for all to be seated (even if on the floor) in reasonable comfort.

## **G** } PROTECTION OF PROPERTY

A SURVEY should be made of the more vital parts of the plant to see what can be done to afford local protection against damage by blast and splinters, especially for machinery which is essential to the continued working of the factory. Particular attention should be given to steam boilers and to surface pipes of essential water and gas supplies and to the switchboards and cables of electricity supplies. The piercing of supply pipes, besides causing dislocation to the factory, might involve the flooding of shelters, or explosions.

The storage of highly inflammable material, should receive special consideration on account of the grave risk of fire. Where this is not already done, a plant containing inflammable liquid stores should be dyked so as to prevent burning liquid spreading over a large area. Where there is a large storage on an upper floor of a building it may be an advantage to provide a drain pipe to a sump outside to prevent inflammable liquid flowing from floor to floor.

As already indicated, incendiary bombs may be expected to pierce roofs and burn on the floor of the top storey. It is most important, therefore, to take all possible steps to reduce the risk of fire, partly by having adequate arrangements to extinguish fires quickly, and also by reducing, as far as is practicable, any stocks of inflammable materials on the top storey.

Telephone switchboards and other places essential to communication and control will require protection, also any place earmarked for use as a first aid post or for some other air raid precautionary purpose.

Any large area of glass should be protected, by wire netting or otherwise, to prevent scattering of glass if it should be shattered by an explosion.

Protection of the property against the hazard of fire is dealt with in subsequent paragraphs.

## **H** } FIRE WATCHERS

FIRE Watchers should be provided in sufficient numbers, and in a sufficient number of "shifts" so that when an Air Raid Warning sounds—day or night, whether the plant is open or closed—every vulnerable point comes under immediate observation.

Fire Watchers must be trained and equipped to make short work of Incendiaries when they fall and be on the alert to summon aid from the plant Auxiliary Fire Services if and when a fire gets beyond their control. A comprehensive booklet on how to deal with Incendiary Bombs is available and every Fire Watcher should be fully familiar with its contents. Every Fire Watcher should be equipped with the simple but effective means of dealing with fire bombs as described in the booklet. The important steps to be taken at once are: first, to select the vantage points from which adequate protection can be assured and, secondly, to select sufficient dependable personnel to man these points when the alarm sounds, no matter at what hour.

## **I** } AUXILIARY FIRE SERVICE

Fire precautions in factories, important at all times, are rendered immensely more important when war risks have to be taken into account, for these introduce new factors and call for special precautions which do not enter into the problem in peacetime. This arises in a number of ways. For instance:

(1) Incendiary Bombs, incendiarism and increased risk of accidental fires under wartime conditions, all increase the fire hazard.

(2) Danger of fires occurring in several parts of the plant at the same time.

(3) Risk of normal water supplies being cut off by damage or depleted by excessive demands elsewhere.

(4) Possible delays in obtaining outside help due to road blockage or other demands on regular fire services.

For these reasons it is incumbent upon all who are responsible for factories and other industrial establishments to review their fire precautions with the object of guarding against these risks, so far as that is possible, and, in particular, to make the premises much more self-sufficient in all matters of fire protection than is necessary in peacetime, including the provision of emergency water supplies.

### **Fire Practices**

The organization of Fire Practices for all members of the staff is another ordinary fire precaution which becomes especially important as a safeguard against war risks.

### **Fire Parties and Fire Appliances**

Those chosen to form fire parties should be steady, reliable, possessed of common sense and able to direct men and women in an emergency.

It is essential not only to organise fire parties, but also to drill them regularly with the appliances they will have to use in case of fire.

Separate fire parties will be required for each shift, and, in wartime, the risk, when work is not going on, may be as great as when it is. Fire parties, therefore, will need to be on duty throughout the twenty-four hours, and when the factory is not fully occupied, it will be particularly important to have every part regularly and frequently patrolled.

It is highly desirable that all Auxiliary Fire Services should be reviewed by your local Fire Authorities and their advice sought and followed as to protective steps to be taken both as to personnel and equipment as well as to organization and protective measures.

## **J } FIRST AID**

THE extent of the preparations which it may be possible to make for dealing with casualties must vary in accordance with the facilities of the plant concerned. Cases of serious injury normally will have to be sent to hospital by ambulance, but every effort should be made to give first aid for minor or even major injuries within the premises.

Each plant must decide, in the light of its particular conditions, on the best organisation of its casualty service.

Arrangements have been made with the St. John's Ambulance Association to assist in training additional personnel for First Aid work where this is desirable. Such training is always an asset under any conditions of peace or war and it is difficult to imagine a plant having too many people trained in First Aid.

### **First Aid Post**

A First Aid Post will be required. When there is a plant hospital normally it will serve for this purpose; though it may have to be extended to cope with the number of casualties to be expected if the plant were bombed. In very small works first aid facilities may be provided in the shelters, in lieu of a First Aid Post. In works where a large number of persons are employed or which cover a wide area, more than one First Aid post may be necessary.

A careful check should be made of all first aid supplies and equipment on hand and these should be supplemented where necessary without delay.

If the plant has suitable vehicles for use in transporting serious casualties to hospitals, arrangement should be made for their quick conversion for ambulance use, including suitable stretcher equipment.

## **K** } POLICE SERVICES

THE Plant Police Chief should be in charge of all police activities and the work of air raid wardens. He should have general responsibility for maintenance of discipline and for development of morale.

The Police Chief should supervise all guards and watchmen, should be responsible for all persons entering the plant area, and should be charged with safeguarding the plant and its materials from subversive activities as well as from theft.

He should control all traffic and maintain a clear route to permit the necessary automobiles, rescue trucks, etc., to reach the scene of an incident.

Under the Plant Police Chief, there should be a Senior Air Raid Warden in charge of all Wardens and Fire Watchers. Persons serving as wardens must be calm individuals with presence of mind who can act as advisers and guides to other employees.

The wardens will be prepared to handle the evacuation of employees from the plants to air-raid shelters. Each employee should be shown how to go by the most direct route from his working station to an air-raid shelter. He should go without noise, confusion, haste, or loss of time.

The wardens will check the effectiveness of the plant's Blackout and report any lights showing to the Senior Warden.

## **L** } CLEARANCE AND REPAIR GANGS

IT IS, of course, impossible to anticipate, and make provision for, every possible type of damage which may occur as the result of enemy action. Dealing with Air Raid damage is a matter for initiative, ingenuity and organizing ability. It requires putting first things first, surmounting obstacles and making the best, for the time being, of conditions as they exist.

What will be required depends on two factors: the nature, layout and type of construction of the plant and the nature of damage caused by enemy action. The first can be anticipated, studied and plans made to suit the case. The second cannot be anticipated. Therefore, the head of this branch of your protective service should be a man of resourcefulness, alert and confident, cool in emergency and able to direct and inspire his men.

## **M** } THE ESSENCE OF THE WHOLE MATTER

THE successful accomplishment of the objectives of your Plant A.R.P. Organization will depend on these few fundamental points:

- (a) Careful survey of the problem well in advance.
- (b) Skilful planning and organization, with the co-operation of Municipal Service Heads.
- (c) Co-operation within your own organization and with your local A.R.P. Services.
- (d) Thorough training of all your protective groups for their respective jobs.
- (e) Practical, realistic drills and rehearsals.
- (f) Eternal vigilance.