Management strategy for fire

Management strategy for fire occurs when a project is being planned — so this publication is not about firefighting, nor about the technicalities of fire protection.

Management's role is to keep the business going and make profits.

A fire can stop this, so it's also management's job to see that his business won't be interrupted.

This publication tells how total business operations can be planned to prevent or limit the effects of fire.
This publication describes how fire protection thinking should be applied to a total business, rather than just to the safeguarding of building and contents. The subject is approached from the standpoint of being self-insured. The question of whether to seek cover for the inevitable remaining risks after applying the thinking put forward is a separate issue, not within the scope of this booklet.

To bring the whole subject alive the publication uses hypothetical factory settings and simulated industrial situations to show how management can organize its own strategy for the control of fire. The procedure advanced is broad in concept, designed to stimulate practical management decisions in the formative stages of a project.

The traditional approach to fire protection is to identify and seek to eliminate the causes of fire or, failing that, to detect a fire as early as possible and contain it while being extinguished. This approach arises, quite properly, from a desire to protect life and property. But occasionally fires develop to serious proportions before being controlled.

With increased centralization and mechanization there is a special need to protect against the consequences of fire. The loss of a small key area or facility may be low in terms of physical damage but nevertheless causes a very serious loss in terms of consequential disruption of trading.

For example, where a process plant is controlled by an on-line computer, damage to the computer could put the entire plant out of action. Failure of a single-source power supply or, in motor-vehicle mass production, the cessation of manufacture or supply of components such as axles or distributors, could bring a whole industry to a halt.

In planning a new industrial facility or the major adaption of an existing one, management must review many factors, bearing in mind that any industrial facility is part of a long production and distribution chain starting from the provision of the initial raw materials and ending with the final consumer. Among the factors to be considered are availability and reliability of labour, provision of power supplies, facilities for disposal of waste, etc. in each of these factors are certain hazards. How secure is the electric power supply - is stand-by generating capacity necessary? Are additional suppliers of materials and components needed to protect against sudden loss of supply? Is any one item of plant critical to the whole operation - should it be duplicated in a suitable manner?

The problem is to identify particular cases of potential risk and to apply accepted protective measures. In so doing it may become obvious that the original conception of the facility can be significantly changed, often without increasing cost, in order to provide much greater safeguard against many of these risks. The thinking must take place in the initial planning stages before even a brief can be prepared for an architect or a designer and it must be carried out by or on behalf of top management.

The same sort of thinking can be used to highlight requirements for protecting a business from fire and this publication describes a systematic method for analysing the functions of an industrial facility from the fire viewpoint.

The publication is presented in a form which need only take senior management half-an-hour to read. The case studies at the end are of three very different types of business in order to show how the method advocated here is applicable over the whole field of industry and commerce. Although the examples given relate to new buildings, the general approach could with profit also be applied to many existing premises. Some of the drawings of factory lay-outs should, in particular, engender ideas as to how fire safety can be introduced alongside measures to improve work flow.
From the Chairman's Office

W. Capper, Esq.,
Chairman and Managing Director,
Grenstone (Plastics) Ltd.,
123-129 High Road,
Carshalton,
Surrey.

February 14, 1972

Dear Bill,

I am calling a full meeting of the Board for February 27 to consider the implications for the whole of our group from the destruction last month at the Carshalton factory.

Since this disastrous fire occurred you and I have talked at length with our group insurers, the loss adjusters and with the fire brigade. In the light of these talks it is clear that we must review the whole matter of fire and its possible effects on our several undertakings.

I know from my talks with you that your plans for reconstruction are well in hand but I must underline the necessity of our taking safety against fire fully into account in the design of the new building.

We are also faced, as a group, with re-building plans for two of our other subsidiaries - Rightway Sales Ltd. and Southsea Caravans Ltd. - so that this moment is highly opportune for a thoroughgoing review. I would also like our other companies to give urgent thought to the fire safety of their existing premises.

I am enclosing a report of the Carshalton fire and in the light of what happened there I shall be asking you to report on the company's fire safety.

Yours sincerely,

Conrad Naylor

C.C. C. P. Wilson, Rightway Sales Ltd.
 E. Harcourt, Southsea Caravans Ltd.
 S. L. D. Voss, Elphicks Engineering Co. Ltd.
 J. Inger, Tradium Tooling Co. Ltd.
The fire that got the Group Chairman worried

Lack of fire separation in plastics container factory - £628 000 loss

Carshalton
Manufacture of plastics containers
London Fire Brigade
Tuesday January 14
Call 3.08 a.m.
20 pumps
Estimated damage: £628 000

Construction
Area: 525ft x 225ft
Storeys: one and two
Walls: steel-framed, brick
Floor: concrete
Roof: metal decking covered with insulation board and bituminous felt on unprotected steel columns.

The fire started in the production area of the factory among stacked cardboard boxes containing plastics bottles. Carelessly discarded smoking materials are believed to have been the cause.

Employees on the night shift tried to extinguish the fire with a hose reel but the water pressure was very low because of a fault on the trunk main and they were unable to prevent the spread of flames which quickly extended throughout the production area, assisted by the combustible nature of the roof, and into an adjoining stock room.

Between the production area and the stock room were double-swing heavy-duty rubber doors for use with fork-lift trucks but with little resistance to the passage of fire. In the stock room fire spread was further aided by the presence of cartons full of plastics containers which were stacked up to roof truss level, inadequate separation between the stacks, and cascades of burning droplets from the collapsing stacks of polystyrene.

When the fire brigade arrived the whole premises was ablaze and fire-fighting was hampered by the unprotected steelwork which was in danger of collapsing.

The building structure was severely damaged, much of the production machinery put out of action and the contents of the stock room destroyed. The fire underlines the dangers from processing and storing a readily combustible product such as polystyrene in a building with inadequate fire separation and no means of automatic fire extinguishment.
Report of the Board Meeting held February 27

Present: C. Naylor (Chairman)
        W. Capper
        C. P. Wilson
        E. Harcourt
        B. L. D. Voss
        J. Inger
        K. C. Murray (group accountant)
        L. Carnegie (secretary)

The meeting was solely concerned with plans for better protection of each of the companies in the group against the dangers of fire. The Chairman, in his opening remarks, said that the object was to apply fire protection thinking to the whole of the group's operations, bearing in mind that a quite small fire could have serious long-term effects on business and that much could be gained at comparatively little cost by increasing the degree of protection built into a project.

He noted that with increased mechanization there was a special need to protect against the consequences of fire. In particular it was now very easy for a small key area to be vital to the operation of an entire enterprise.

The Chairman said that one point that the fire at Grenstone (Plastics) Ltd. had brought home to him most forcefully was that as a group they had been too much obsessed by what reduction they could make in their insurance premiums by the installation of various fire protection systems. Their job, he said, was to make and sell their products; if they were stopped from doing so by a fire they could go out of business even though, as the secretary pointed out, a strong insurance programme was in operation for the whole group covering not only direct losses but business interruption, including suppliers' extension to business interruption.

The most profitable approach was to re-plan factories and processes with the question of fire in mind. While increased production and storage facilities might well seem to offer decisive production advantages they could also be significant factors in allowing small fires to become large and destructive ones. By separation and sub-division of the various stages of production or storage areas they could limit the size of a fire and thus reduce the resultant delays in getting supplies going again to customers.
The criterion, therefore was to plan in such a way that fire had the minimum effect on operations and deliveries to customers.

It was pointed out that in most cases sprinkler systems would qualify for substantial reduction in insurance premiums but that a number of other factors had to be taken into account - in particular the availability of water supplies.

After some discussion it was agreed that the three companies immediately concerned with rebuilding plans - namely Grenstone (Plastics) Ltd, Southsea Caravans Ltd, and Rightway Sales Ltd. - should now prepare detailed reports on their operations. In this they should take account of all possible effects of a fire and in particular the short-term and long-term risks to markets. Recommendations should be made as to the fire safety measures deemed necessary.

To help the directors concerned, the meeting drafted guidance notes (copy attached) as to the form these reports should take.
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Management strategy for fire
Board considers effect of fire on companies' operations

Report of the Board Meeting held February 27

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W. Capper
C. P. Wilson
E. Harcourt
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He noted that with increased mechanization there was a special need to protect against the consequences of fire. In particular it was now very easy for a small key area to be vital to the operation of an entire enterprise.

The Chairman said that one point that the fire at Grenstone (Plastics) Ltd. had brought home to him most forcefully was that as a group they had been too much obsessed by what reduction they could make in their insurance premiums by the installation of various fire protection systems. Their job, he said, was to make and sell their products; if they were stopped from doing so by a fire they could go out of business even though, as the secretary pointed out, a strong insurance programme was in operation for the whole group covering not only direct losses but business interruption, including suppliers' extension to business interruption.

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The criterion, therefore was to plan in such a way that fire had the minimum effect on operations and deliveries to customers.

It was pointed out that in most cases sprinkler systems would qualify for substantial reduction in insurance premiums but that a number of other factors had to be taken into account - in particular the availability of water supplies.

After some discussion it was agreed that the three companies immediately concerned with rebuilding plans - namely Grenstone (Plastics) Ltd, Southsea Caravans Ltd, and Rightway - should now prepare detailed reports on their operations. In this they should take account of all possible effects of a fire and in particular the short-term and long-term risks to markets. Recommendations should be made as to the fire safety measures deemed necessary.

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Addendum to report of Board Meeting, February 27, 1972

Factors to be considered in assessing overall fire risk - to be used as a basis for preparing a plan of fire precautions

1. Nature of manufacturing and/or procurement
   - overall pattern of manufacturing - flow
     - batch flow
     - batch
   - batch or order frequency
   - procurement lead time
   - product range
   - seasonal production

2. Nature of sales
   - overall pattern
   - seasonal sales

3. Nature of market (following sudden loss of manufacturing and/or procurement facilities)
   - delayed sales
   - lost sales
   - lost customers

4. Nature of possible losses
   a. How fire could result in:
      - loss of supply of raw materials and components
      - loss of services such as electric power, gas, oil, water, communications facilities, waste disposal
      - loss of premises, plant and stocks of raw materials and work-in-progress
- loss of finished goods stock
- loss of distribution facilities to points of sale
- loss of office records

b. The immediate effects and long-term effects of any such loss
- disruption of trade
- increased operating costs
- loss of sales
- dissipation of technical and labour force
- loss of goodwill and profits

c. Areas which may be specially sensitive to fire and its aftermath
- is any one item of plant critical to the whole operation; should it be duplicated?
- are additional sources of supply of materials and components needed to protect against sudden loss of supply?

4. The fire hazard - for the business as a whole and for individual areas, particularly key areas
- risk of initiation of a fire - High/Medium/Low
- risk of spread of fire - High/Medium/Low

These classifications should be seen as relative to each other, not having any fundamental risk value. A risk which may be rated as high in one business may be medium or low in another.

5. Analysis of potential fire losses
- possible direct loss - High/Medium/Low
- possible indirect loss - High/Medium/Low

6. Conclusions

The Chairman had prepared some diagrams of factory layouts (attached) where reorganization had achieved a better flow of work while at the same time making provision for fire separation. He hoped that the directors would be able to achieve similar improvements in their premises.
Management strategy for fire
Improving the work flow can also mitigate the effects of fire

ENGINEERING FACTORY LAYOUTS

Both these layouts facilitate a measure of fire separation between compartments thereby limiting the potential damage and loss.

MACHINE SHOP

Tool Room  |  Maint

Materials

ASSEMBLY

Test

Components

WAREHOUSE

Despatch

Separate Shops

IN

OUT

Single Shop

Machining

Sub-assembly

Tool Room  |  Maintenance

Materials

Components

WAREHOUSE

Test

Assembly

Legend:

internal fire walls

The drawings on this and the facing page are based on illustrations in "The Principles and Practice of Management", by E. F. L. Brech, published by Longmans, to whom we acknowledge our thanks.
The revised layout not only improves the flow of work and therefore the efficiency of the operation, but makes it possible to provide a measure of fire separation which can help to limit the extent of damage and loss.

Legend:
- internal fire walls
- internal fire doors
C. Naylor, Esq.,
Chairman,
Springhead Holdings Ltd.,
Springhead House,
26-28 Great Pelman Street,
London WC2

March 6 1972

Dear Conrad,

As requested at our recent Board Meeting I am enclosing a full report and recommendations in regard to fire safety of our new works.

You will see that some questions need to be answered and that we shall doubtless have to consult with fire and insurance experts for this purpose.

Yours sincerely,

W. Capper

W. Capper

manufacturers of plastic containers for the pharmaceutical and food industries
Following the fire in January we have acquired new factory premises.

Our manufacturing process is a conventional vacuum-formed polystyrene continuous production line. The main raw material is granular polystyrene which is stored in a series of outdoor steel silos. The polystyrene granules are pneumatically drawn through pipelines to the individual production lines. Each line begins with an extruder machine which heats the granules and expels the resulting liquid as continuous wide film. This material is calendered, stretched and immersed in a solution bath before reheating and vacuum-forming. After forming, the strip passes to a further machine which punches out the individual containers. The skeleton strip is granulated for re-cycling and pneumatically conveyed to a hopper for proportionate mixing with the raw materials.

Sales
Sales consist of a small number of large orders, most of which are on call-off schedules.

There is a steady background demand for the company's products, with a substantial accentuation at holiday periods, particularly during the summer.

Market
Inability to deliver finished products for up to a week would delay sales, of up to four weeks would lose sales, and of over four weeks would lose customers.

Nature of possible losses

Raw materials The raw material market is extremely competitive and it is thus very unlikely that raw materials deliveries would be cut off.
Management strategy for fire

Grenstone (Plastics) Ltd

Services  The company is heavily dependent upon electricity and water supplies, but these are reasonably secure and special precautions are not considered necessary.

Premises, plant and raw materials stocks  The business of the company is particularly sensitive to availability of large items of specialist plant such as extruders and moulding machines which would take between six and nine months to replace. If the buildings were seriously damaged by fire it might well take some six months to restore them. By contrast, fresh supplies of raw materials could be obtained within a few days.

Finished goods stock  The finished goods warehouse normally holds between one and two weeks' production. Loss of this stock would not seriously impair the company's business over a long period.

Distribution facilities to points of sale  Finished goods are delivered to customers by contractors on behalf of the company. The haulage business is very competitive and a sudden loss of all means of delivery is very unlikely.

Office records  Loss of office records would cause considerable inconvenience, but such an event is unlikely to jeopardize the long-term future of the business.

Fire hazard

Risk of initiation of a fire

Medium risk  the manufacturing process plant by reason of the heavy electric currents used by various items of equipment

Low risk  all other areas, including raw material storage, finished goods storage and offices

Risk of spread of fire

High risk  raw materials storage, finished goods storage and all the manufacturing process area

Low risk  all other areas, principally the offices
Potential fire losses

Potential direct loss arising from a serious fire

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High loss</td>
<td>The manufacturing process plant, since although not combustible, this equipment can be seriously damaged by intense heat</td>
</tr>
<tr>
<td>Medium loss</td>
<td>the finished goods warehouse</td>
</tr>
<tr>
<td>Low loss</td>
<td>all other areas, including raw material storage and offices</td>
</tr>
</tbody>
</table>

Potential indirect loss arising from a serious fire

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High loss</td>
<td>The manufacturing process plant because of the length of time needed to obtain replacements</td>
</tr>
<tr>
<td>Medium loss</td>
<td>the buildings, again because of the time required to restore adequate protection to continue operations</td>
</tr>
<tr>
<td>Low loss</td>
<td>all other areas</td>
</tr>
</tbody>
</table>

Results of analyses

It has become clear that maximum fire protection should be applied to the process plant.

Compartmentation with fire walls appears highly desirable.

The first thought was to use a fire wall to separate the production area from the finished goods storage area. As a result of the analysis it is now considered that, if possible, each of the individual production lines should be in a separate fire compartment.

However, in practice, a reasonable balance could be struck by dividing the production area into two fire compartments (see drawing attached).

It is felt that full sprinkler protection would be beneficial. Could we explore the costs of this?

An additional conclusion emerging from the analysis is that care should be taken with the design of the raw material feed pipe system, from the outdoor silos to the production lines, so that there should be no chance of fire passing up the pipe either to the silo system or, more particularly, to another production line.
Management strategy for fire
Grenstone (Plastics) Ltd

Legend:
- internal fire walls
- internal fire doors
- future expansion
The company is located in old and unsuitable premises, in which it has grown from small beginnings. It has reached the stage where further increase in output is not possible within the existing buildings. Accordingly a green-field site has been purchased and a new development planned.

The main production and storage areas to be accommodated are:

- Timber yard
- Timber machine shop
- Timber components storage
- Timber fitments assembly and finishing
- Chassis manufacture
- Body assembly
- Furniture, trim and assemblies installation
- Aluminium and hardboard sheet storage (outdoors)
- Body panel manufacture
- Body panel storage
- Body paint
- Final inspection
- Despatch storage (outdoors)
- Assemblies storage
- Steel storage (outdoors)

The manufacturing process is a production line beginning with chassis manufacture and carrying through to inspection of the completed caravan; other processes such as the manufacture of body panels and timber fitments, and the preparation of installed assemblies, are carried on peripherally, feeding to the assembly line through a series of small buffer stores.

Nature of manufacturing

The main production line operates on a batch-flow basis and the "feeder" areas on batch production.

On the main production line, the more popular batches are normally repeated about once per week. The feeder shops repeat batches every two
to four weeks.

In the main, the overall procurement lead time for standard products is about two days. This time is based on piecepart stock being available or on feeder shop batches being suitably scheduled.

Five basic models constitute the product range. Variants to each model consist of optional extras (such as a fitted refrigerator), or of road traffic requirements of the countries to which caravans are exported (such as door position, lighting equipment and towing attachments).

The production volume is steady throughout the year provided market demand is adequate.

Individual orders by dealers consist in the main of between one and five caravans, with large orders rarely exceeding twenty.

The sales pattern is very seasonal, with a heavy demand each spring and early summer. Dealer discount policy is used in an endeavour to promote stockholding purchases especially in the autumn and mid-winter.

Market
Because of stocks held by the dealer network, an interruption of manufacturing of up to about two weeks would normally just delay sales. (This is of course provided that market demand is not already exceeding maximum production capacity). An interruption of over two weeks would tend to lose sales to the competition. Because the life of a caravan is about 10 years, the question of losing customers' repeat orders would hardly arise.

Nature of possible losses

Raw-materials and components Most of the raw materials and bought-out components required for the manufacturing process are readily obtainable. In most cases, in the event of the sudden loss of any one supplier, alternative sources of supply can be arranged at fairly short notice, usually within the period of the stocks normally held on site. (It has to be accepted,
however, that there may be a price penalty involved in changing a supplier).

Services Like most other organizations, the business is heavily dependent on electric power supply. However, there is no reason to expect a failure of supply for any length of time which would cause serious disruption. No other services are particularly critical.

Premises, plant and stocks The buildings are the most valuable assets, followed by installed plant, and then by stocks and work-in-progress. So far as disruption is concerned, the buildings and certain items of plant would take the longest to replace, followed by the majority of the plant, with stocks and work-in-progress relatively readily replaceable.

Finished goods stock Completed caravans are stored in the open, with adequate spacing. At certain times of year, the value of finished goods held in stock is high, but the risk of loss by fire is nevertheless very small.

Distribution facilities to points of sale Haulage contractors undertake the major part of deliveries of finished caravans to dealers. In the event of a withdrawal of this service, it is probable that other contractors could be found; in any intervening period no doubt many dealers could themselves collect caravans.

Office records Office records are vital. They have little direct value, but it would be worth identifying really critical files and hold them (or suitable duplicates) in a separate fire resisting area.

Fire hazard

Risk of initiation of a fire

Medium risk welding in the chassis manufacturing shop, and inert-gas welding of aluminium body seams on the assembly line

Low risk all other areas
<table>
<thead>
<tr>
<th>Risk of spread of fire</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk</td>
<td>paint shop, timber machine shop, timber store, bought-out trim store (including foam plastics)</td>
</tr>
<tr>
<td>Medium risk</td>
<td>timber components storage, timber fitments, assembly shop, timber fitments storage</td>
</tr>
<tr>
<td>Low risk</td>
<td>all other areas, including canteen and offices</td>
</tr>
</tbody>
</table>

Potential fire losses

Potential direct loss arising from a fire

| High loss             | timber machine shop (because of the value of installed plant) |
| Medium loss           | timber storage and body panel shop (because of the value of presses) |
| Low loss              | all other areas |

Potential indirect loss arising from a fire

| High loss             | timber machine shop (because of the time necessary to replace certain specialist machines) and body panel shop (again, because of the time to replace presses and special dyes). |
| Medium loss           | chassis shop (mainly because of the jigs required) and the offices (because of certain key records) |
| Low loss              | all other areas |
Conclusions from analysis

The manufacturing block diagram is as shown below, with potential risks and losses shown against each area.
From a total fire risk viewpoint, the block diagram suggests the following:

- The chassis shop and the body assembly shop (medium fire initiation risk areas) should be well separated from the timber machine shop and the body paint shop (high fire spread risk area); timber is normally stored outdoors in any case, which itself provides good separation.

- The timber machine shop has a high fire spread risk and high potential direct and indirect losses. In addition to enclosing it with fire walls and installing a sprinkler system, would it be worth dividing it into two separate fire compartments, with vital plant duplicated where possible in each half?

- As would be expected, the body paint shop must be well isolated by fire walls and doors from the remainder of the factory. Such isolation is of course only satisfactory if the fusible-link-controlled fire doors will close with certainty in an emergency. In practice, in the context of a flow production line, it is quite easy for a caravan - or other obstruction - to be standing in a doorway at the critical moment. If it is not possible to ensure rigorous shop-floor discipline in this respect, then - depending on a series of other production factors - might it be worth considering buying pre-painted aluminium sheet for the body panels?

- The body panel shop (high potential indirect loss, medium potential direct loss) should be kept well separated from the medium and high fire spread risk areas, in the main the timber working and storage areas.

The resulting factory block layout is shown on facing page:
Southsea Caravans Ltd

Car-Parking & Finished Goods Storage

Legend:
- internal fire walls
- internal fire doors
Our company is the result of a merger last June of four mail order companies operating in the same region of the country. Each of the companies was operating in old multi-storey timber-floored industrial buildings which had been extensively fitted with sprinklers. Experience in the highly competitive mail order business showed that immediate service was essential in order to retain customers.

During the studies which have followed the merger it has become clear that there is little scope in the combined business for further expansion of turnover. However, there would be great potential operating savings to be made by centralizing all activities on one site. This offers the possibility of reducing the overall stockholding - and thus of lowering inventory, storage, handling and insurance costs - and of mechanizing both the physical handling of goods and the processing of paperwork.

When evaluated in terms of savings on annual operating costs the project appears very attractive. Nevertheless, the management had become increasingly reluctant to embark on a scheme involving centralized stock because of the anticipated disastrous consequences of a fire on both short and long-term trading. However, an analysis of the business in the proposed form in terms of the inherent fire hazard shows that with a particular configuration of compartmentation by fire walls and fire doors, and by building separation, it is indeed possible to achieve the desired commercial objective and at the same time reduce the hazard of business interruption by fire.

Nature of procurement
Most items are obtained under negotiated bulk orders, with weekly and monthly call-off schedules. Delivery schedules for a majority of items can be adjusted within one to two weeks and new orders executed within six weeks. Certain items however with heavy seasonal sales must be ordered at certain times of the year.
The range of merchandize consists of between 15,000 and 20,000 items. Customers judge the performance of the company by the ability to deliver goods as ordered within a few days of despatch of order.

Sales

Sales consist of a large number of small orders, which must be executed rapidly - usually on the day of receipt.

A significant proportion of all goods is sold in various seasonal markets. The net effect, however, is relatively constant sales around the year.

Market

Experience shows that failure to effect the large majority of despatches on the day of receipt of order leads to irretrievable loss of customers to competing companies.

Possible losses

Supply of merchandise. Although contracts for the supply of goods are the result of detailed and sometimes lengthy negotiations, the market in which they are purchased is very competitive. There are also various alternative methods of transporting goods from the supplier to the warehouse. Thus, loss of supply - though obviously critical - is very unlikely.

Services. Since no manufacturing is involved, services generally are not nearly so critical to the operation of the business. However, if in the new warehousing complex fixed mechanical handling equipment is employed, continuity of the electric power supply will assume greater importance. Similarly, if there is mechanization of the office procedures, the power supply will also become more important in this area.

The most critical service however, is the post. Orders are received daily from many thousands of customers.
Management strategy for fire

Rightway Sales Ltd

The most critical service, however, is the post. Orders are received daily from many thousands of customers.

Premises, plant and stocks. The sudden loss of premises, and particularly of stocks could well be disastrous for the business.

Distribution facilities to points of sale. Facilities to despatch goods to customers are clearly vital to the business. However, with several methods available (rail, road haulage carriers, post), this aspect of the business is not considered vulnerable.

Office records. This is a very important aspect of the company's business. The offices should be arranged to be unaffected by a warehouse fire. If computers or other centralized processing equipment are to be used, duplicates of vital records should be held in a separate location on the site.

Fire hazard

Risk of initiation of a fire. There being no industrial processes involved, the most likely causes of fire are electrical faults, careless use of smoking materials, intruders and so on. The risk of fire initiation is rated as low.

Risk of spread of fire. In a large, open warehouse, the risk of spread of fire once started, would be high. Much therefore depends on the layout of the future building(s) and on devices such as sprinklers, alarm systems and so on.

Potential fire losses. The overall value of a combined central stockholding would be high, and substantially more than the building required to contain it. If areas of a centralized warehouse can be considered separately, then goods receiving, goods inwards inspection, order picking and despatch would be rated as a low direct loss risk by comparison with the bulk stock area. On the other hand,
with centralization, office procedures would be extensively mechanized, including the use of an in-house computer, and thus the potential direct loss in the offices would be high.

It is estimated that the indirect losses from a fire could far outweigh direct losses. Particularly vulnerable is the bulk stock, which if suddenly lost could well cause the business to collapse completely; the risk here is rated as high. A fire in the offices would almost certainly destroy vital records, and thus this area is rated as medium indirect loss risk. In the remaining areas, the indirect loss risk is low.

Conclusions from analysis

It is clear that special protection is required for bulk stocks. Normal fire protection considerations require the bulk stock area to be separated from the remainder by fire walls, and in addition to be divided into at least two compartments in order to reduce the fire risk to a more manageable size for fire-fighting purposes. Particular care needs to be taken to isolate the goods receiving bay from the bulk stock areas, since despite a strict no-smoking policy in specific areas, only limited control could be exercised over delivery drivers employed by other organizations.

It is felt that sprinkler protection of a fairly sophisticated kind is required virtually throughout and technical advice on this point is required.

The office block needs to be isolated from a fire viewpoint. This requirement in any case fits well with the architect's concept of site development, including semi-prestige offices to be divorced aesthetically from the goods handling and storage function. Specialized protection for the computer is required and, additionally, facilities are needed to hold duplicate computer tapes in a small fire-resisting enclosure in a remote part of the site.

The site block layout emerging from this analysis is shown overleaf.
Management strategy for fire
Rightway Sales Ltd

Legend:
- internal fire walls
- internal fire doors
- future expansion
Memo to chairmen of all subsidiary companies

Subject: Fire Safety

The Chairman of the group has engaged the services of Mr. L. C. Weekes, former Chief Fire Officer of Wessex Fire Brigade, to act as Group Fire Adviser.

The Chairman was much impressed by a recent report in the Fire Protection Association’s magazine telling how a large mail order business set about planning a new warehouse in Worcester. At the instigation of the Chief Fire Officer, consultative meetings were arranged between the management of the company and its project engineer, the building contractors and handling-equipment engineers, the firm’s insurer, fire equipment engineers, and the fire brigade. As a result of this collaborative exercise it was found possible to devise a fire-safety system tailored to the special requirements of this highly-automated warehouse - and all within a strictly-limited period of time. Mr. Weekes will have as his over-riding brief the objective of bringing together in this way all the parties concerned in our three re-building projects.

He will also be ready to help and advise other of our companies on their fire problems as and when required.
This guide to
MANAGEMENT STRATEGY FOR FIRE
is based on the advice and experience of P-E Consulting Group Ltd. and is published by the Fire Protection Association. It may be purchased from the
Fire Prevention Information and Publications Centre,
Aldemary House,
Queen Street,
London EC4N 1TJ

The Fire Protection Association is the central advisory organization, largely financed by insurance companies and Lloyd's, providing technical and general advice on all aspects of fire protection.

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