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# INVISIBLES: INSURANCE

## Loss prevention in fire and marine cargo insurance

Study by the UNCTAD secretariat

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CONTENTS

INTRODUCTION

1. The Committee on Invisibles and Financing related to Trade, at its seventh session (October-November 1975), recognized the importance of the role that loss prevention measures could play in the process of strengthening local insurance markets in developing countries and included in the programme of work of the secretariat a study on loss prevention in the field of marine cargo insurance. 1/ As a result of the discussions which took place two years later at the first part of the Committee's eighth session (December 1977) in connexion with the insurance of large risks in developing countries, 2/ the secretariat broadened its research to cover also the topic of loss prevention in the fire insurance sector. The present study, parts of which were prepared with the help of consultants, is the result of that research. It comprises three parts: part one sets out some general considerations on loss prevention, whilst parts two and three deal with loss prevention in fire insurance and in marine cargo insurance, respectively.

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1/ See the report of the Committee (Official Records of the Trade and Development Board, Seventh Special Session, Supplement No. 2 (TD/B/590)), paragraphs 132 and 157-159.

2/ See the report of the Committee on the first part of its eighth session (Official Records of the Trade and Development Board, Eighteenth Session, Supplement No. 3 (TD/B/684)), paragraphs 10 and 37-41.

## PART ONE: GENERAL CONSIDERATIONS ON LOSS PREVENTION

### The purpose of loss prevention

2. It is widely accepted that prevention is better than cure. This motto, which applies to all facets of life, applies particularly to risks covered by insurance. Everyone agrees that fire losses, road accidents, loss of or damage to property and equipment etc. entail not only human suffering and tragedies, but also in most cases wastage and unnecessary depletion of wealth and resources, which can seriously affect the economy and hamper its growth.

3. It is true that insurance makes good the economic loss sustained by the insured. Yet, even when each specific individual loss is eliminated for the policy holder through the insurance technique of spreading risks and paying claims, the over-all burden of loss still remains for the community as a whole. This is because the indemnities paid out on claims by the insurer are financed by the premiums, i.e., the charges, collected from the mass of the insured. Furthermore, it should not be overlooked that conducting insurance business involves other costs than meeting claims, such as acquisition of new business, management expenses and reinsurance costs, which are by no means negligible. All such costs must also be charged ultimately to the insured and thus to the community.

4. Finally, when a loss occurs, it is not only life and property which may be harmed; there can be a number of consequential losses which insurance does not compensate adequately. For instance, a serious fire will not only damage buildings and equipment but may also throw people out of work and cause the loss of production, profit and markets. Other firms may suffer loss through interruption of supplies, and so on.

5. Thus, when an insured transfers his risks to an insurer this does not mean that he is completely protected from the aftermath of such occurrences or that his community is able to avoid the economic distress which loss can cause. However, insurance and loss prevention combined are the most appropriate and efficient safeguards. Loss prevention avoids or reduces losses and insurance indemnifies what is not preventable; neither can supersede nor replace the other.

### The economics of loss prevention

6. Although prevention of all losses might seem very desirable, yet economically it is not feasible. A basic approach to loss prevention is that the cost of labour and materials used to avoid (or reduce) losses should be less than the cost of repair or replacement, multiplied by the probability of loss if no preventive measures were taken. It is the element of saving which determines the economic feasibility of loss prevention measures. The potential gains from preventive action have to be weighed against the cost involved and, unless the gains equal or exceed the cost, the action is uneconomical.

7. This principle cannot be applied, however, to cases where human suffering is involved. Nevertheless, it has to be realized that there is likely to be an optimum level of expenditure on loss prevention beyond which further expenditure would achieve no reduction in the risks, simply adding to the total cost of any losses which may occur.

The beneficiaries of loss prevention

8. It is obvious that insured persons and firms are the first beneficiaries of loss prevention action, even if they are well protected by insurance. This is because their main concern is the conservation of their property and the continuation of their activities. Generally, they are inclined to pay a higher price for safety rather than face uncertainties with regard to the indemnification of losses if they have to file claims against their insurers.

9. Loss prevention bestows a collateral benefit upon the community and the national economy as a whole, since losses impose a burden on society, irrespective of who pays the bill. The economic consequences of losses go far beyond property damage; they have social and financial implications which could threaten the very structure of a society and the well-being of its people. To illustrate this it is sufficient to recall the pollution catastrophes of Sevezo in Italy, and Amoco Cadiz off the coast of Britanny, France. These two occurrences, apart from the damage they caused to property and investments in the areas affected, created extensive social and economic problems which the Governments of the two countries had to face.

10. Loss prevention measures also tend to be profit-making for the insurers, since they are aimed primarily at reducing insurance companies' losses. This very consideration motivated the first fire insurers in Britain, early in the 14th century, to form and maintain their own private fire brigades to protect the buildings they covered. The same motive induced Lloyds underwriters, as early as the 18th century, to classify risks and ships' bottoms according to the degree of hazard involved, to reward good risks and penalize bad ones.

11. However, their interest in loss prevention is apparently not as obvious to some insurers as it should be. They argue that their interests lie in a larger premium income, whereas the improvement in loss experience leads to lower premium rates. However, these insurers should not forget that in the long run lower rates attract larger insurance portfolios, which produce a greater spread of risks. This consideration is of great importance in markets characterized at present by small premium volume and its corollary of fluctuating results. Another effect of loss prevention is the levelling of risks, creating more homogeneous portfolios which require less extensive reinsurance arrangements.

12. Of particular concern to insurers is the problem of deteriorating results or adverse experience. It is not easy for them to raise the premium rates each time they face adverse trends. In many cases stiff resistance on the part of the insured, and even of governments, can render such a change in rating structure impracticable or at least considerably delay it. Raising premiums is often counter-productive, because it may encourage the insured to resort to self-insurance, to take high deductibles, 3/ even to form captive insurance companies. Such measures can lead ultimately to a serious reduction in the insurer's premium income.

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3/ In effect, partial self-insurance, because the insured meets the cost of a claim up to a predetermined sum (the "deductible") in exchange for paying a lower rate of premium.

13. If we accept the premise that premium increases alone do not offer a permanent solution, we are left with loss prevention measures as the ultimate answer to deteriorating results. Through loss prevention, every insured would have the right to treatment by the insurer according to the safety and degree of protection against his own risks which he provides. In this way, loss prevention promotes a true premium justice: good risks pay reasonable premiums and bad risks pay higher premiums.

Responsibility to prevent loss

14. The prime responsibility to prevent loss obviously lies with the insured himself. However, loss prevention efforts must be based on a sentiment shared by the community at large. Individuals may or may not be responsive to the requirements of loss prevention. If the insured is a large firm, it may decide to introduce risk management techniques to control and prevent loss. However, since not all the insured are large firms and not all large firms are equally motivated to invest in loss prevention, it is for the community, represented by the government, to enforce loss prevention measures. For instance, only governments can require all industries to adopt certain safety standards, to cease undesirable practices and to provide necessary information. On the other hand, governments usually provide certain services, such as fire brigades and police.

15. Insurers have a definite interest in loss prevention action and must therefore be prepared to share responsibility in this field. Their approach to loss prevention is that, inasmuch as they insure certain risks, they should have some say in the attitude of the insured towards his risks. In fact, insurers enjoy a unique position with regard to loss prevention. They are particularly well equipped to discharge some of the functions involved because, in the course of their daily activities, they develop considerable experience in analysing hazards, settling claims and compiling relevant statistics.

16. In view of these considerations, insurers generally support all efforts aimed at loss prevention. They spend considerable amounts on loss prevention campaigns; they organize inspection of risks; they even go far beyond direct loss prevention measures, resorting to research and developing new safety standards and practices; they collaborate closely with governments, public organizations concerned with safety, manufacturers, etc., in providing advice on risk reduction and loss minimization. Insurers are particularly interested in promoting laws, codes and regulations concerned with safety.

Forms of loss prevention

17. Loss prevention action is composed of the following four categories of measures: preventive, protective and minimizing measures and salvage

18. Preventive measures are of a fundamental or structural nature. In most cases they have to be taken in the planning phase, when building, rebuilding, fixing machinery layout, planning equipment, specifying processes and materials, etc. They aim at obviating loss entirely. A fire loss for instance can be avoided by fire resisting construction, fire doors, etc. Insurers are able to place their knowledge and experience at the disposal of the insured when they contemplate the erection of new buildings or introduction of new processes, so

that from the outset the hazards are reduced to the minimum. Adherence to recommendations made by the insurers leads to a reduction of rates of premiums for such risks. The cost of loss prevention is often offset by the resulting reduction in the cost of insurance. What preventive measures should be taken will depend on what saving in insurance-premiums will result.

19. Protective measures do not entirely eliminate loss, but limit its occurrence. Like preventive measures, they are taken in advance, before any loss occurs. Protective measures against certain risks are undertaken largely by the community, for example, the maintenance of fire brigades to combat fire and police forces to guard property and regulate road traffic, thus reducing road accidents. Such measures still leave plenty of room for individuals to supplement the community's efforts, by installing fire fighting equipment and warning devices, by arranging watch and ward services, etc. Insurers are very helpful in advocating the best ways and means of protection against loss. Furthermore, they sometimes undertake inspection services to ascertain the existence and adequate functioning of safety devices and to detect faults and weak points before they result in loss or damage. In some cases, such inspection is carried out on a periodical basis, for example, in the case of fire and engineering risks.

20. Minimizing measures are those whose purpose is to reduce the severity of losses in terms of money. Such action is particularly necessary for risks which cannot be avoided completely, such as motor accidents. In this case, wearing safety belts may reduce the gravity of bodily injuries to the driver and passengers. Against fire risks, probably no device for minimizing losses is more popular than automatic fire sprinklers, which are widely used in factory and storage buildings. Against marine cargo risks, efforts to minimize loss include the provision of supervision for loading and discharging operations, the use of containers and lift trucks, etc.

21. Salvage, on the other hand, takes place after a loss has occurred. It is profitable if the salvaged property is worth more than the cost of salvage. Salvage is seldom undertaken by the community; in most cases it is carried out by professional organizations at the request of the property-owner or the insurer. For instance, in the event of fire, salvage action consists of clearing the water that was sprayed on the property to quench the fire, drying the floors, removing salvaged articles to safer premises, effecting temporary repairs and restoring the damaged property. In cargo business, salvage involves repacking goods, keeping valuables in safe custody, selling damaged goods, etc. It should be noticed that there may be some overlapping of measures between the above categories, in that some of them serve more than one purpose; however, every type of action can generally be considered separately.

Methods adopted by insurers to encourage loss prevention

22. There are various methods by which insurers can encourage their policy holders to adopt loss prevention measures. They may load their rates for bad risks and reduce them when the risks are improved. Underwriters must therefore assess the risks and provide terms and conditions of cover which reflect their exposure. When a risk proves unprofitable, insurers often offer advice to the insured on how to improve it and, unless this advice is followed, increase the premium rates. Conversely, insurers offer lower rates and discounts where the insured had adopted measures to minimize the frequency and severity of losses. Insurance rates that are properly discriminatory, according to the probability and severity of hazards, are an important factor in motivating loss prevention action by the insured.

23. Another method which insurers rely upon to induce their clients to improve the risks is the restriction of insurance cover. This is achieved in two ways, either by introducing deductibles (franchises) or by restricting the scope of the cover. Introducing deductibles makes the insured participate in each and every loss. As experience has proved, deductibles increase the interest of the insured in preventing and minimizing the loss. The restriction of the scope of the cover means in practice that the insured becomes self-insured for the hazards which are excluded from the guarantee of the insurer. This step may convince the insured to take all possible measures to eliminate or reduce loss. Finally, insurers may exercise pressure on the insured through declining to cover the proposed risk on any terms if its condition is too bad. However, this is not a popular measure with insurers and in some countries it is illegal.

24. Apart from the above indirect methods of inducing clients to improve their risks, insurers generally make direct contributions to activities aimed at loss prevention, such as inspection services, salvage corps, research and publicity.

25. Before the underwriter can agree to cover a risk and determine the appropriate rate of premium to be applied, he must assess the risk situation. This requires the inspection of the risk by competent and qualified surveyors commissioned by the insurer. Hardly a survey is carried out without some suggestions being made for risk improvement measures which may or should be taken. Some risks need to be watched constantly in order, for example, to ensure that no important structural or other alterations are carried out without consultation with the insurer, or to check on the existence and maintenance of adequate loss prevention appliances. In many cases, and particularly in industry, the periodical inspection carried out by the insurers' surveyors is even more important to the insured than the financial indemnity provided by the insurance in the case of loss.

26. In some countries, insurers form and maintain their own salvage corps, whose prime responsibility when a loss occurs is to take all necessary measures to preserve the value of the damaged property to the fullest possible extent. In certain countries salvage operations are undertaken by loss assessors or loss adjusters working on behalf of the insurers.

27. In some countries, the insurance industry, in an endeavour to improve safety standards and to achieve better loss experience, has set up research centres or technical organizations which conduct research, compile statistics on specified hazards and then stimulate awareness of the necessity of loss prevention through publicity and education. To this end, they address themselves to the public at large and their clients in particular by means of booklets, films, slides, etc. Sometimes they organize training courses, seminars and exhibitions, during which they provide loss prevention know-how to specific trades and industries. Often these research centres provide consultancy services, not only to the insured but also to architects, manufacturers and government authorities concerned with safety. Such research centres are particularly important in these days of rapidly evolving technology, because they can serve insurers and insured by keeping them up to date on new technological developments and their impact on the degree of risk, thereby making them aware of new processes and products which may involve new risks.

Limitations on the role of the insurance industry in loss prevention

28. Loss prevention generally benefits the insurers, but there are some circumstances where there may be a certain conflict of interests. For instance, some risks are sufficiently high to justify large premiums. Since premiums not only pay claims and expenses but also contribute to the insurer's profit, it may seem better to some insurers to have a high-risk portfolio with high premiums rather than a low-risk portfolio with low premiums. This is particularly true if the market premium rate for low-risk business is insufficient to pay expenses and meet the unavoidable claims which will still arise, whatever action is taken to avoid the risk. It is therefore obvious that risk reduction, if pushed to the extreme, may seem detrimental to the interests of the insurance industry, most particularly when the latter needs additional premium income to develop extra capacity in a market where the demand for cover is increasing.

29. It is clear that salvage measures are always advantageous to the insurer; and they rarely have a direct impact on the level of premiums. The extent to which an insurer should provide loss prevention services depends on his expectations in respect of each category of risks, with a due regard to the nature of his portfolio, its volume and the degree of its exposure. It also depends on the effective cost of these services. Such costs may reach the point where the benefits derived from loss prevention are less than its cost. Obviously, the insurer may offer these services on a fee-paying basis, which is tantamount to risk management. Risk management and loss prevention have many features in common, but the two activities stem from totally different concepts.

Loss prevention in developing countries

30. While its importance in any economy can hardly be over-estimated, loss prevention assumes paramount importance in developing countries because their particular economic and financial circumstances make them unable to bear the consequences of large or repeated losses, especially in connexion with the foreign exchange components of many of their investments. A large fire loss sustained by a developed country normally results in a minor set-back to its over-all economy, but for a developing country such an occurrence may amount to a national disaster. In addition, every day of production lost costs the economy dearly. In order to make the best possible use of their resources and manpower it is the duty of developing countries to take every step to ensure safety, preserve the continuity of production and hence maintain income.

31. Loss prevention can indeed play an outstanding role in promoting the growth and improving the performance of domestic insurance markets in developing countries. In order to realize the importance of this role, it is necessary to explain the developments which have taken place in these markets and to focus on some typical features which characterize these markets at present.

32. In most developing countries intense efforts are made to achieve rapid economic and social progress. These efforts have resulted in a marked growth in the number of risks (whether insured or not) and their complexity. The exposure of the insurance market has also increased, owing to the concentration of values at risk and the extensive application of modern technology, represented by the use of new materials, new processes and new methods of production, transportation,

construction, etc. Risk exposure in developing countries is further intensified by the absence in most of these countries of up-to-date safety codes for the protection of life, property and manufactures. Even if these countries have such codes and regulations they often lack the machinery to ensure their enforcement. The lack of modern, efficient loss prevention equipment and appliances, which would generally have to be imported from abroad at relatively high cost, is also a negative factor in the risk situation in developing countries. Finally, there is the phenomenon of a low level of loss prevention awareness, owing to the novelty of urban and industrial behaviour for the majority of people in developing countries.

33. Simultaneously with the emergence in developing countries of new, more complex risks, there was the establishment of domestic insurance companies. The principal objective of domestic insurance sectors was to cover local risks in the local markets, thus replacing foreign insurance services, in an endeavour to reduce foreign exchange expenditure. In most developing countries these infant domestic insurance sectors have to assume their responsibilities under extremely difficult circumstances. In addition to very limited capital resources and lack of know-how, they must face the problem of a level of premium receipts too low to give a reasonable spread of risks, generally associated with insufficient diversity in the risks covered and the absence of a good volume of simple ordinary risks known to yield good results. This double "anti-selection" deprives the insurer of the possibility of compensating losses on the higher risks from the gains on a diversified portfolio with a preponderance of ordinary risks. These drawbacks create an uncertain situation for the insurer, compelling him to load his premiums to obtain a margin of security. This is a factor accounting for the relatively high insurance costs in developing countries, compared with those in developed countries.

34. Obviously, high premium rates discourage the public from covering their risks by insurance, particularly in the absence of sufficient awareness of the benefits of insurance. This discouragement causes a contraction of the market, resulting in loss for the insurer. Moreover, when rates are high, those with the best risks will find it uneconomical to insure, a situation which leads to a decline in net receipts by the insurer. The poorer experience on the remaining risks then renders rates uneconomical once again. Thus the maintenance or lowering of premium rates should be the aim of domestic insurers in developing countries in order to achieve a larger turnover and attract a wider spread of risks. This aim cannot be achieved, however, unless there is a definite improvement in loss experience; in practical terms, this means taking loss prevention action, in particular.

35. The drawbacks described above have a direct impact on the way insurers handle risks. In view of the small volume of premium and the consequent lack of spread, the underwriting results are generally subject to fluctuations. To safeguard themselves, the insurers retain for their net account only a small proportion of the business they write, reinsuring the balance abroad. This behaviour is understandable, because the proportion retained is closely linked to the prospects of profitability. Yet excessive reliance upon reinsurance deprives the insurer of his income and prevents him from achieving growth. At the same time, it burdens the national economy and the balance of payments with unnecessary transfers of hard currency.

36. Action to avoid losses or reduce their severity may contribute to the balancing of the insurer's portfolio and improve the profitability of his operations. These two results may induce the insurer to curb his excessive reinsurance and maximize the business retained. Moreover, the improvement in profitability due to loss prevention action can help the insurer to earn the confidence of his reinsurers, which in turn is translated into better reinsurance terms and a more stable reinsurance relationship. Finally, improving profitability through loss prevention action is an important means of creating extra insurance capacity. This consideration is of major importance for developing countries, where risks tend to increase in terms of both volume and exposure because of the development projects that are carried out. This situation requires additional capacity to handle the increased volume and meet new requirements for risk cover.

# PART TWO: FIRE LOSS PREVENTION 4/

## Chapter I

## THE RESPONSIBILITY OF THE PUBLIC AUTHORITIES

### The threat of fire

37. The manufacturing capacity of established industrial countries is generally sufficient to absorb a loss through fire without undue effect on the economy as a whole. Many manufacturing plants have spare capacity, so that they can increase their combined output sufficiently to fill the gap caused by the loss of another plant. This is obviously a generalization, which would not apply to the production of some highly specialized product or commodity for which all the manufacturing capacity is concentrated in one plant. The loss of such a plant would necessitate importation and burden foreign exchange resources.

38. The latter is the situation which may well confront most developing countries, since total manufacturing capacity for many products or commodities tends to be concentrated in only one or a few plants without spare capacity. Thus a fire may have serious consequences for the economy of the country. To provide spare capacity would be wasteful of the country's resources. Hence prevention and control of fire loss is an important factor in the economy of a developing country.

39. The health of the economy may depend not only on stores of raw materials and finished products but even on office records which may contain valuable information vital to the continuity of business operations. A developing country is often in much the same position as any one business in a developed country, in that the loss through fire may so disrupt trading operations that it is incapable of recovering from the fire. If the equipment of the factory necessited foreign exchange expenditure, so may its re-equipment, thus placing an additional burden on the economy.

### Principles of the control of fire

40. Fire has enormous potential for destruction. The combustion of fuel releases heat so that, once started, a fire will grow at an accelerating rate unless remedial measures are taken. Either the unburnt fuel must be separated from the heat or the supply of air cut off or the heat removed. The separation of combustible materials will limit the amount of fuel which can contribute to the growth of fire. The confinement of fuels within building compartments will limit the amount of air which can feed the fire, as well as preventing the heat from the fire from reaching further combustible fuels.

41. However, in order finally to extinguish the fire, the combustible material must be cooled below its ignition temperature. Water, which has a high latent heat of vaporization, is the most effective coolant but it must be applied in sufficient quantity and at such a rate that it will prevent the growth of the fire. A fire discovered within two or three minutes of its outbreak may be extinguished with less than 1,000 litres of water. If the water is not applied until five or ten minutes later, which is probably the shortest time in which a fire brigade may reach the scene, the fire will have grown to such proportions that between 50 and 100 times as much water may be needed to extinguish it.

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4/ This part has been prepared by Mr. N.C. Strother-Smith, Director of the Fire Protection Association, London, who acted as consultant to the UNCTAD secretariat.

42. It can be seen therefore that, if remedial measures are not taken in the very early stages following the outbreak of a fire, the limitation of the ultimate loss is going to depend on either a strict control of the amount of fuel exposed to any one fire or the provision of a well trained fire-fighting force equipped with fire-extinguishing appliances capable of delivering large quantities of water in a short space of time and, most essentially, large reserves of water. The amount of water required increases exponentially with the time taken for the fire-fighting forces to reach the scene of the fire and start effective fire-fighting operations.

43. An automatic sprinkler installation will, in the great majority of cases, control and extinguish a fire with less than 1,000 litres of water and may therefore be the most economic way of limiting the loss in a fire, particularly in areas of limited water supplies. This does not mean to say that a well trained and well equipped fire-fighting force is not necessary. The national financial resources available for loss prevention can however be more efficiently deployed if the automatic sprinkler installation is regarded as an important part of the over-all national fire-fighting resource.

44. It may be of doubtful value to rely on a public, central fire brigade, whether in a town or a country district. Most towns and cities in developing countries are confronted with a rapidly deteriorating traffic situation. If the fire brigade is unable to reach the scene of the fire and apply water to the seat of the fire in adequate quantities within 15 minutes, or at the outside 30 minutes, it may be confronted with a total loss. In a rural area not only is the fire brigade likely to have to travel a long distance to the scene of the fire but it may well have to carry adequate water with it. Some provision should therefore be made for each business to be equipped with adequate fire-fighting facilities and trained men on the premises. A compromise could of course be reached where several businesses are in close proximity to each other; in this case a common brigade could be established to service all the businesses.

45. The planning of towns and cities and the siting of factories should be carried out with the needs for fire protection in mind. Adequate natural water sources in the vicinity are the first consideration. In the absence of natural sources provision should be made for the bulk storage of water for use for fire-fighting purposes only. If reliance has to be placed on a central fire brigade then great care has to be taken in the town planning and in the siting of the fire brigade station to ensure that fire-fighting vehicles are not impeded by traffic problems in their attempts to reach the scene of the fire. Since the efficiency of the fire brigade depends on its early arrival at the scene of the fire, every building must contain the means of transmitting a call direct to the fire brigade control point. Manual means of transmitting the call should be supplemented by an automatic fire detection system which, when actuated by the fire, automatically transmits a call to the control point.

The part played by the building in loss control

46. The principal determinant of the size of a fire loss is the amount of fuel exposed to any one fire, which can be restricted by subdividing buildings into compartments of limited size by means of fire walls and floors that provide resistance to the passage of fire, so that an outbreak will be confined to the compartment where it starts. National governments should therefore establish building regulations that limit the size of compartments and also of the building itself.

47. Worldwide, there is a growing tendency towards the construction of tall buildings. It could well be believed that the status of a city is sometimes judged by the number of skyscrapers. Tall buildings may be economically desirable where land is scarce but little justification can be made for them where land is plentiful. Quite apart from the constructional problems involved, tall buildings present serious difficulties from the point of view of fire safety. Two fires which occurred in Sao Paulo, Brazil, within little more than a year of each other in 1973 and 1974 demonstrated the impossibility of the fire brigades fighting the fire and evacuating the occupants. These fires are fully documented in the publications of the Fire Protection Association. Only where the scarcity of land overrides all other considerations should the development of tall buildings be countenanced.

48. The ideal maximum height for buildings from the fire protection and fire-fighting point of view is 25 m. This is approximately the maximum reach of the longest fire brigade fire-fighting ladders. This limitation has generally been accepted with the aim of saving the lives of those who may be trapped in the buildings. If a fire has developed to such an extent that rescues have to be effected through windows via fire brigade ladders and the fire has to be fought from outside the building, serious damage must be done and a heavy loss suffered. From a loss prevention point of view single storey buildings, adequately subdivided to limit the amount of goods exposed to any one fire, provide the most satisfactory conditions.

49. Fire walls and floors must have sufficient resistance to ensure that, whatever a compartment may contain, a fire in it cannot destroy these separating elements. The size of the compartment and the degree of fire resistance of the separating elements will need to be related to the nature of the contents and also to the time a fire is likely to burn before intervention to fight or extinguish it is possible. In extreme cases, the fire resistance of these elements may need to be such that they can withstand a complete burn-out of the contents of the compartment without allowing the fire to spread. The limitation of the size of compartments - and for that matter the size of the building - may be undesirable from the business point of view. If this should be the case and compartments or buildings larger than the regulation size are indispensable, then the installation of automatic sprinkler systems should be mandatory.

50. The fire resistance of walls and floors and other elements of building construction is measured in Europe and America by placing sample products in specially designed furnaces, which simulate the growth of a fire. Structural elements intended to separate spaces, such as walls and floors, are required to resist collapse and the passage of heat and flames. Their fire resistance is measured by the time that the element survives the test. Load-bearing elements such as beams and columns are tested until they collapse.

51. Openings in walls are needed for movement between compartments and from compartments to corridors giving access to staircases and liftshafts. It is the provision of these openings which is the weak point in fire safety within a building. If doors are left open or if vertical shafts open directly onto the compartments on the different floors of the building, fire will quickly spread from compartment to compartment and from storey to storey.

Such openings must be provided with the same degree of resistance as the wall or floor in which they have been made. To prevent the passage of fire from floor to floor staircases, liftshafts and other shafts have to be encased in fire-resistant walls and the openings onto staircases and shafts have to be provided with doors providing the same degree of fire resistance. Building regulations must therefore deal with all openings in walls and floors for vertical and horizontal communications. Standard ways of controlling the spread of fire through staircases and shafts are in general use in most countries of Europe and in America.

Safety of the occupants of buildings

52. Staff and workpeople must be safeguarded by ensuring that in the event of fire the occupants of buildings can escape without having to go through the fire or through smoke. In most buildings the subdivision by separation elements can provide places of safety, since the occupants can move to an unaffected part and thence to the outside. In buildings of more than one storey the escape of the occupants depends on the use of staircases. These, therefore, have to be planned in such a way that a fire cannot affect more than one staircase; if one staircase is rendered unusable by fire or smoke, the occupants of the building can then move to another one. Designing the building in such a way as to ensure the safety of occupants requires a thorough understanding of the behaviour of fire. Guidance will need to be sought from recognized publications on the subject.

Building materials

53. The materials used in the construction of buildings should as far as possible be such that they are not capable of contributing to the development of a fire. Ideally, therefore, incombustible materials only should be used in the construction of buildings but this may be a severe restriction, particularly in countries where timber products are readily available. While timber and timber products can never be rendered wholly incombustible, they can be treated in several ways to reduce the risk of ignition and to limit the contribution they can make to the development of a fire. If timber is used for structural purposes, as columns and beams, then provided it has a sufficient cross-sectional area it may be capable of withstanding the effects of a fire without collapse for periods of time that are sufficient for many purposes. There are naturally strict limitations to the use of timber in this way and great care would need to be taken to ensure that such use was permitted only after proper consideration.

54. Timber and timber products should not be used for fire separating elements because of their combustibility. They may be used in certain forms of construction, however, where they are protected from the immediate attack of flame and heat by incombustible construction material, so that they cannot reach an ignition temperature. Timber is used as a core in certain sandwich construction, for example; it is protected from the heat of a fire and provides a useful insulation to prevent the passage of heat through the sandwich panel.

55. Timber is, of course, widely used for doors, particularly in private houses and other residential accommodation. In sufficient thickness, a timber door will hold back fire for possibly even as much as one hour, although the maximum rating which has been achieved by doors in Europe and North America is half an hour. The Fire Offices' Committee accept a 45 mm solid wood door as providing one hour's fire resistance.

56. Timber is often used in sheet form for decorative purposes and timber products and plastic materials are often used in ceilings. Limitation should be placed on such use of combustible materials, since they can make a major contribution to the growth of a fire.

57. Incombustible materials do not necessarily provide fire resistance. Structural steelwork loses its strength quite early in the development of a fire, possibly causing the building to collapse. Concrete, when subjected to high temperatures, spalls and the material falls away with a resultant loss of thickness. These are just two examples of incombustible materials which need careful handling in the design of fire resistance in a building. Most European and North American countries can provide examples of fire resistance achieved by various forms of construction and of the development of building regulations to provide appropriate degrees of safety from fire.

58. When building regulations are being formulated it is important that an approval system should be included, whereby the plans for buildings may be inspected before authority is given to start construction and buildings may be inspected after completion before authority is given for their occupation. To facilitate the control of buildings, it is recommended that a system be established for approving properly qualified architects and builders, so that the public can be aware of those whose qualifications have been recognized.

Building services

59. Electricity and gas are the principal sources of energy for heat, power and light in any community, be it industrial, commercial or residential. Both of them are major potential causes of ignition, wherever they are used. In the case of electricity, the passage of a current generates heat, sometimes intended for use in plant processes or for space heating. Heat is also present in electric lighting apparatus and anywhere that electricity is transmitted along a cable. It is generally the temperature rise, in fact, which limits the capacity of any given piece of electrical equipment. All such equipment, therefore, must be carefully rated according to the work it is expected to do. If it is overloaded, excessive heat will be generated and a fire may ensue.

60. Fires may also be caused by defects in electrical equipment, damage to electric wiring insulation or by allowing combustible materials to come too close to electrical equipment which is running hot. A high standard of installation and maintenance is therefore necessary to ensure safety against fire arising from the use of electrical equipment. Safety codes need to be established and they need to be enforced. Only qualified electrical contractors should be allowed to carry out electrical installations. It is therefore desirable to establish a safety code and the system by which it will be enforced. The latter implies a system of approval for qualified electrical contractors. The inspection and approval system should embrace standards for electrical equipment manufactured domestically or imported from abroad.

61. Similar practices to those recommended for electrical installations should be applied for gas installations. Gas used as a source of energy is likely to be either natural gas or liquefied petroleum gas. In addition to the hazards of installation and use there are also the hazards of storage. A safety code should

therefore be established for the storage of gas, which should cover all forms of storage from bulk quantity tanks to small unit cylinders serving private dwellings. As with electrical equipment, a system of inspection and approval should also be established and applied to the storage and installation of gas equipment.

62. In buildings where a central plant is installed for the transmission of conditioned air by ducting throughout the building, it is necessary to ensure that the ducting does not provide a means by which fire can be spread throughout the building. In the event of fire the air conditioning plant should be shut down. This is ideally achieved by connecting the control of the plant to the automatic fire detection system, so that when a fire is detected the air conditioning is automatically shut down. In addition, the ducting should be provided with fire-resisting shutters, wherever it traverses a fire wall or floor, which close automatically when the plant is shut down.

63. Wherever any of the building services traverse fire walls or floors, the openings provided for them should not be allowed to impair the fire resistance of the latter.

Building contents

64. Regulations will need to be made to control the handling and storage in buildings of hazardous materials. The materials which are controlled in this way in Europe and North America include explosives, certain chemicals and flammable liquids whose flashpoint is in the region of 23°C or lower. The most commonly used flammable liquids are derivatives of petroleum and liquefied petroleum gases. Storage in quantities exceeding, say, 10 litres should be subject to special precautions in accordance with a licence.

Fire protection advisory services

65. The level of control which a government exercises through national regulations will depend on the standards of safety which are developed in the design and construction of plant, equipment and building services and/or are established by managements, workpeople and the public at large for the handling and storage of hazardous materials and for the general management of plant and processes.

66. In western Europe and in North America standards of fire safety have been evolved by blending government regulations principally concerned with public safety and the safety of workpeople with the financial inducements of insurers and with codes of good practice developed by the national standards institutions, national fire protection associations and in many instances by individual trade and industry associations. In many countries the national fire protection associations continuously survey the fire scene and act as watchdogs on behalf of the public at large. Thus trends in fire hazards come under the surveillance of both governments and fire protection associations, with the result that corrective action is taken as soon as possible.

67. National governments should therefore encourage the setting-up of fire protection organizations with the function of developing fire safety standards in equipment and codes of good practice for buildings, processes and installations. Encouragement should be given to the convening of conferences and the establishment of committees through which manufacturers, building developers and designers of buildings and equipment can learn about the fire safety features which they should incorporate into their designs of buildings and products, while users can learn about the fire safety standards which they should adopt in their premises.

Education and training in fire prevention

68. Fires are caused almost entirely by people, either through their actions - accidental or deliberate and malicious - or through their inaction - failure to take such appropriate precautions as regular inspection, maintenance and repair of defective equipment. The prevention of fire therefore depends almost entirely on people. If people understand the nature and behaviour of fire, they will be in a better position to recognize fire hazards and to take preventive measures. National governments should therefore encourage schools and colleges to include instruction on these matters in their curricula. Children of all ages, university students, engineers, designers, architects and managements should all receive some instruction in fire and its control.

## Chapter II

## THE RESPONSIBILITY OF MANAGEMENTS

### Surveying the fire risk

69. Fire may be the quickest way of bringing a business to a halt. A fire will not only interrupt the whole process of manufacture and production. The buildings and plant may well be in ruins and before they can be replaced and production restored much work in clearing up the site will be necessary. It will also be necessary to determine what has been lost and damaged. Even if only a small part of the plant has been involved in fire, staff will need to be diverted from other work to clear up the mess and to plan the rebuilding and restoration of production.

70. The successful prevention of fire loss depends almost entirely on the capability of the management of the business. Fire creates total waste. Such waste would not be tolerated by any efficient management if it occurred in the course of business operations. No management should tolerate such waste being created by fire. The management must survey the operation of the business in its entirety to determine where the potential loss through fire lies, in order to exercise control.

71. The first step which the management of a business already in existence should take in making a survey is to identify the fire risks. This is best done by identifying on a plan of the premises all the potential sources of ignition, the materials which will burn and the ways in which fire can spread. The plan should also be marked to indicate the relative importance of various areas, plant and equipment to the continuity of business operations, as well as their susceptibility to damage. By means of such a plan it should be possible to identify the relative loss potential of the various areas of the business, thus determining where the greatest need for protection lies.

72. In the case of a business whose establishment is being planned, the same process of identifying the fire risks and loss potential of various areas should be carried out before the plans are finalized. In this way, it may be possible to devise a lay-out from the outset which presents the minimum loss potential and thus reduce the need for protection.

73. The lay-out of the buildings will need to be studied to determine the ways in which fire can spread and the possible extent of the damage, with a view to controlling the spread by creating subdivisions. The materials of which the building is constructed will need to be studied to determine whether they would contribute to the spread of a fire and whether they would provide the necessary level of resistance for fire walls and floors. It will be necessary to investigate whether the standard of installation of the building services conforms with the best practice.

74. The fire risk presented by each item of plant and equipment must be considered. The risk may arise from the plant's potential for initiating a fire or from its susceptibility to damage in a fire or by virtue of the fact that it is a key item in the maintenance of business operations. Plant that processes flammable liquids or gases presents much greater risks than much other plant.

75. The ease of ignition and the likelihood of damage by fire, smoke and water of the raw material inputs and the finished goods will have to be considered. Attention should be given to such matters as bulk storage in the open or in warehouses, the storage and handling of materials in day-to-day use and the handling and disposal of waste products.

76. Fires do not break out only in manufacturing or storage areas. They may start in offices, canteens or kitchens, in which case they can be prevented from spreading to the manufacturing and storage areas by means of adequate separating structures.

77. Fires originating in the open can be prevented from spreading to buildings by ensuring that the latter are always surrounded by an area free from combustible materials such as stores of finished goods, cartons, stacking pallets, scrap material, grass and scrub.

Fire precautions

78. After evaluation of the fire risks in terms of the potential immediate loss, as well as the long-term effects of such a loss on the business, an attempt should be made to determine the time which may be required to restore full production following a fire, which depends above all on the time required to replace materials, plant and equipment which have been destroyed. It is therefore advisable to maintain a schedule of all such major items and their availability for delivery in the event of loss.

79. It would be a very serious fire that destroyed at one blow the entire manufacturing capacity and all stocks. This of course must be avoided by subdividing the manufacturing capacity and by segregating the storage of raw materials and finished products from each other and from the manufacturing plant, by means of fire walls and floors. Subdivision of storage areas will also prevent total destruction of stocks in the event of fire. In this way the continuity of the business can be maintained even though it be at a reduced level.

80. In many manufacturing operations it is not feasible to divide up the manufacturing capacity into two or three separate production lines. Where the output depends on a single production line the whole factory risks being shut down in the event of fire affecting any one part of that production line. To some extent the disruption of business can be postponed by having sufficient stocks of finished products from which to supply customers.

81. The following are some of the factors which can cause delays in restoring full production:

- Specialized raw materials or machines which have to be made to special order may well take many weeks or months to manufacture and, if they need to be imported, may take many weeks to be delivered.

- Any complex factory operation which is dependent on extensive electrical, hydraulic or pneumatic controls may require many weeks of extensive skilled labour to reinstate.

- Plant and equipment which work to a high level of precision may require long commissioning periods.

The existence of such factors, which may cause long delays, calls for special precautions to control the outbreak and spread of fire.

82. It has already been seen that one of the principal means of controlling the extent of fire loss is to limit the amount of material exposed to any one fire. This is achieved by the use of fire-resisting walls and floors to subdivide the buildings. A measure of control can also be achieved within the subdivided areas by maintaining safe distances between stacks of materials and plant, so that fire-extinguishing equipment can be brought to bear and the fire confined to the smallest possible area.

83. An important element in the prevention and control of outbreaks of fire is the training of workpeople. As has been said earlier, it is people who cause fires and it is people who can be instrumental in preventing and controlling them. By training all the workpeople in the operations which they perform most fire hazards can be avoided. This applies particularly to workpeople engaged in operations involving hazardous materials but it also applies to routine operation of plant and equipment and to the day-to-day behaviour of everybody employed in the business.

Extinguishing the fires which do break out

84. In the last resort, when a fire does break out, the means of controlling and extinguishing it must be to hand. Water is vital for this and a store of water must be provided exclusively for fire-fighting purposes near all plant and equipment. While water is the most effective fire-extinguishing agent for general protection of premises, there are certain items, such as live electrical equipment and flammable liquids on which the use of water may be dangerous and other agents have to be used. Fire-fighting equipment has therefore to be chosen with care and suited to the specific risks to be found on the premises. Portable fire extinguishers and hosereels need to be provided for the use of the workpeople, who must of course be trained in their operation. The possibility of each business providing its own fire brigade has been discussed in Part One above. In a small business, all the workpeople might be adequately trained to tackle the majority of fires that might break out. In a larger business it is probably necessary for a small number of men, employed on normal company business, to be specially trained in fire-fighting. However, somewhere, sometime, a fire will get out of hand and need the attention of skilled fire-fighting crews equipped with major fire-fighting apparatus. Only a very large business could afford to train and maintain such crews. Consideration should therefore be given to collaboration with other businesses to provide a common fire-fighting force, which would need to be available 24 hours a day, every day of the year.

85. It is quite possible that an automatic sprinkler system, which likewise provides protection 24 hours a day throughout the year, may be more economical than either a common fire brigade or a brigade for each business. Such a system detects the fire, delivers water to the seat of the fire and sounds an alarm. Experience throughout the world with automatic sprinkler systems shows that some 95 per cent of fires are brought under control and extinguished with insignificant losses and that a very high percentage of these fires are extinguished with the operation of one sprinkler head only.

86. Provision must be made in any case for the detection of fire and for the alarm to be sounded. Automatic detection systems are the best since they eliminate the human factor. Even where an automatic sprinkler system is installed it may be desirable to have an automatic detection system as well. Whatever system is adopted, however, it is important that, in addition to an alarm call being transmitted to a

fire brigade control point (where this facility is available), an alarm is sounded at a continuously manned station, for example, the telephone switchboard, so that action can be taken at once to investigate the circumstances to set in motion the appropriate action.

Security

87. Throughout the world security has become a vital part of all business management. The integrity of a business depends on the prevention of unauthorized persons entering the premises. Deliberate, planned sabotage is difficult to combat but there are many measures which can be taken which will make incendiarism and sabotage difficult. Points which need attention are inadequate or damaged fences, broken windows and inadequate security locks on windows and doors. Combustible waste and rubbish should be cleared away, so that it is inaccessible to the incendiarist. Outside storage is of course particularly vulnerable and calls for special care. The stacking of packing materials, storage pallets and combustible waste adjacent to the outside of a building provides a very good starting point for a fire which may spread to the building itself. It should on no account be allowed.

Fire protection manual

88. Having designed the buildings, selected plant and equipment and planned its lay-out and that of storage to minimize the fire risk, the management needs to produce a manual, setting out the ways in which the conduct of the business can ensure the minimum risk of loss from fire.

89. The first part of the manual should comprise a report, based on the survey and plan described in the first section of this chapter. The report should explain the ways in which the fire risk has been minimized and describe the protection that has been provided by subdivision and fire-fighting equipment. This report will give management at all levels of the business an understanding of the risk with which they are confronted and the reasons for the protection provided.

90. The second part of the manual should set out the operating procedures for maintaining the standard of fire protection which has been established, the action to be taken to avoid fire risks and the action to be taken in the event of fire. Fire protection job specifications and operating instructions should be included, detailing the fire hazards, how to avoid them and what to do in the event of a mishap. The job specifications should cover every level of management and all workpeople throughout the business, including the cleaners. They should include responsibility for inspections, repairs and maintenance. Special instructions will be needed for those responsible for building services, for plant engineers and maintenance staff and for those engaged in the collection, removal and disposal of all waste.

91. A third part of the manual should be devoted to the training of staff and workpeople. Provision has to be made for the training of new staff, for refresher courses for all staff at periodic intervals and, in particular, for retraining when operations are in any way altered.

92. The fourth part of the manual should comprise check lists setting out routine inspection and checking procedures to ensure that the standards of fire protection, once established, are maintained on a permanent basis. Special staff should be allocated for inspection and servicing of fire protection equipment and for the inspection and checking of all fire precautions laid down in the manual. The check lists should be subdivided into those items which need to be checked at the beginning and end of every working day and those to be checked periodically as part of the regular fire protection audit. The check lists will be devised from the fire protection plan and from the operating procedures set out in the first and second parts of the manual.

## Chapter III

### THE ROLE OF INSURERS

93. Insurers can play an important part in the establishment and in the maintenance of fire protection standards. To do so however they need to have in their employ qualified fire surveyors who are fully conversant with the nature and behaviour of fire and ways to control it. They must also be conversant with the nature of the businesses which their employer is insuring, the properties of the materials used in, and all the processes employed by, those businesses.

94. The qualified fire surveyor is able to advise both the insurer and the insured: the former on laying down the conditions on which he is prepared to carry the insurance and to establish the premium rate; and the latter on ways of reducing the risk and thus securing a reduction in premium.

95. Insurance premiums must be related on the one hand to the fire hazard to which the insured is exposed and on the other to the protection that the insured provides to restrict the hazard. Where there is a high degree of fire risk or where a fire will so disrupt the operation of the business that it may have to close down for a long period, the insurer should require a level of protection that will reduce this risk before he accepts the insurance. Since the prevention of fire loss is vital to the economy of a developing country, government should support insurers in demanding a high level of protection. It is also of importance to the national economy that insurance premiums should be pitched at an economic level and that the insured should always be given every financial encouragement to reduce his own fire risk.

96. The insurer, in conjunction with the insured, should review paragraphs 65 - 88 of this report dealing with the responsibility of management for fire loss prevention and assist the insured in establishing the fire prevention plan for the business. There will be many points on which the insurer's fire surveyor will be able to advise the insured how to limit his fire risk, but there are three principal means on which the insurer will concentrate for the prevention of loss by fire.

97. The first of these is an automatic sprinkler installation conforming to well recognized practices followed in Western Europe and the United States. Experience has shown that with a properly installed and properly maintained installation most fires are controlled and extinguished with the use of no more than 4 to 6 heads; and that the loss is quite a small fraction of that experienced if there is no such installation. The automatic sprinkler detects the fire and immediately discharges water onto the seat of it. The majority of fires are brought under control by the functioning of one head.

98. The second principal means of improving the fire risk which should be favoured by insurers is the segregation of hazardous processes and materials and the subdivision of the building to limit the size of the potential loss. Since the premium rate should be related to the hazard of the processes undertaken and the materials stored or handled, their segregation from less hazardous processes and materials can allow the insurer to offer differential rates of premium based on the reduced hazard. Segregation and subdivision must be effected by suitable fire-resisting constructions.

99. The third means of ensuring an improvement in the risk is by looking into the efficiency of management of the business. Experience shows that well managed businesses are, in general terms, a better fire risk than those where management control is deficient. It is not easy to measure the efficiency of management; particularly so since a change in personnel may bring about a lowering of management standards. However a business which has established a fire prevention plan on the lines described in the previous section will be a better fire risk than a business without such a plan. The effectiveness of the plan depends on regular inspections and the implementation of the check list procedures. Insurers can satisfy themselves that the plan is being observed by verifying periodically that the check list procedure is being observed. Insurers are aware that the best physical fire protection systems are of little use unless they are properly supervised and therefore they may pay greater attention to the management of the business than to any other feature of risk improvement.

## Chapter IV

## SOME TECHNICAL CONSIDERATIONS

100. This chapter amplifies earlier references to various technical matters by entering in greater detail into the considerations on which an assessment of fire risk depends and the methods of control which have been devised to reduce the risk.

### Buildings

101. When a fire occurs in a building it generates smoke, fumes, heat and flames. Uncontrolled, they will spread to every part of the building in a short time. Being lighter than air, the smoke and hot gases surge upwards, heating everything in their path. When they reach a horizontal obstruction, such as the ceiling or the roof, they will spread laterally. The temperature of such a rising column of convected hot gases can be in the region of 800° - 1200°C. Combustible materials in the path of this column will ignite and incombustible materials may reach a temperature at which they will lose their strength and, if they are structural elements, collapse. Fire is also spread by radiant and conducted heat.

102. Serious fire spread occurs when the hot products of combustion can move extensively, for example up a stairway or a lift shaft or in a large interior where there is little or no horizontal or vertical subdivision. Large, open, single-storey factory buildings provide an example where the heat and smoke from the fire can climb to roof level and spread laterally.

103. Attention has already been drawn to the growing world-wide tendency to construct tall buildings and it has been said that there is no justification for them where land is plentiful. Nevertheless, tall buildings may already be erected or on the point of being erected. Their use is most generally confined to offices, hotels and shops. There are, however, in certain parts of the world multi-storey factory buildings. It should be appreciated that fire can spread not only within buildings, as just described, but also up the outside of buildings and, by radiation, from one building to another. Experience has shown that, where there is a high concentration of combustible materials, flame may emanate from the windows of the compartment on fire and, spreading upwards, ignite the contents of the floor above by radiation through the windows; and then, repeating the process, continue progressively its upward spread. The taller the building the greater will be the intensity of radiation and the greater the risk of fire spread to neighbouring buildings. Control of the combustible contents and of the materials used both in interior and exterior construction is therefore of importance, as also is the spacing of buildings in relation to their height.

104. One particular type of tall building which is being developed increasingly in many parts of the world, in particular for use as a hotel, has an open well as a centre core. The well is roofed over at ground floor level to provide a reception area, vestibule and lounge. The corridor serving each storey opens out directly onto the centre well to give access to lifts which ride within the well. As long as there is fuel within the well on which fire can feed, there is a risk of heat and smoke filling the total well area. Protection has to be provided so that, if fire should break out in the well, the occupants of each storey can escape safely without being exposed to the smoke which may fill the well.

The cause of fire

105. When a source of ignition and a combustible material are in contact with, or in close proximity to each other, a fire is almost certain to ensue. The prevention of fire is therefore concerned with segregating sources of ignition from combustible materials. Such segregation is not always entirely practicable, however, and it is therefore necessary to consider the ignition potential of various sources in relation to combustible materials and what safeguards are practicable. Heat is essential to the initiation of a fire and any form of heat is therefore an ignition source. The use of energy in any form produces heat and therefore all energy sources constitute a source of ignition.

106. The amount of heat required to cause ignition depends largely upon the form and density of the material to which it is applied. A gas or vapour may be ignited by a small flame or even a spark, because the temperature in the vicinity of the flame may well be above the ignition point of the gas or vapour. Dense solids need a heat source of larger capacity to raise them to ignition point, while materials with a large surface area in relation to their mass burn more freely, since oxygen has better access to the surface, and are more readily ignited by a small heat source. As an example, timber of large dimension can be ignited only with difficulty and burns slowly, while wood shavings are easily ignited and burn rapidly.

107. The most common ignition sources resulting from the conversion of energy into heat are electricity, space and process heating and mechanical friction. All are common causes of fire. Other common causes are the careless disposal of smoking materials, the intentional burning of waste and rubbish and the use of flame and electricity for cutting and welding operations.

Materials

108. Materials vary widely in their susceptibility to ignition, their behaviour in fire and the contribution which they may make to a loss. An understanding of the properties of all materials which may be found on the premises of a business is important to the control of fire loss.

Flammable liquids

109. Reference has already been made to materials capable of giving off flammable vapours. These are mainly petroleum spirit and its products, in particular liquefied gases. The vapours can be ignited by very small sources of ignition and therefore special precautions have to be taken in the storage and handling of such materials. The vapours are in general heavier than air, collect at low level and can then travel some distance from their source. If they encounter a source of ignition as they travel, fire will flash back to the source of the vapour. Vapours may collect in basements and other low-lying places and remain there for a considerable period of time. There are three most essential precautions to be taken with flammable liquids: (a) seek to contain them in such a way that vapours cannot escape - for small quantities, containers are available with lids that close automatically in the event of the contents igniting; (b) wherever flammable liquids are handled or stored there should be adequate ventilation to disperse any vapours which may escape; (c) ensure that no sources of ignition can come into contact with the vapours.

110. Materials, the vapours of which may ignite between 23°C and 32°C, should also be regarded as hazardous in that, if involved in a fire, they will intensify it. Special care should therefore also be taken in the storage and handling of such materials. Materials with a low melting point (for example, rubber, bitumen and sugar) may when involved in a fire melt and flow and spread fire widely.

111. Flammable liquids are used in practically every industry, for example, as cleaning fluids, solvents, in paints, as a source of energy for petrol-powered mechanical handling devices and process heating. Bulk storage of all flammable liquids should be in tanks or in a store quite separate from the factory. The quantities allowed on the factory floor should be strictly limited to what is needed for a single day's working or even less. Where flammable liquids are piped from the bulk storage tank to the factory floor, there should be a mechanism to ensure that in the event of fire in the factory the supply of liquid can be cut off at the storage tank and the liquid in the pipework discharged safely outside the factory.

Dusts

112. Many materials in dust form are capable of creating an explosion when suspended in air. The dusts of cereals are particularly susceptible. Certain metal and other mineral dusts, such as aluminium and coal, can explode with considerable violence when suspended in air. Wherever such materials are being ground, pulverized or milled, care has to be taken to contain the dust. There will always be leaks, however, and the dust will collect on ledges and other flat surfaces. Such collections of dust, if disturbed, may be dispersed into the air and create a potentially explosive cloud. Therefore all surfaces should be kept free of dust by regular vacuum cleaning.

113. Textile dust or fly is also a fire risk, in that in the atmosphere of textile mills it can collect and adhere to the oily surfaces of pipework, walls and roofs. It is then susceptible to ignition by a small source and would spread fire rapidly over all the surfaces to which it has adhered. Humidifying the atmosphere of textile mills helps to lay the fly on the floors, whence it can be swept up regularly.

General hazards of materials

114. Certain materials which are contaminated or treated with vegetable oils or fats are liable to self-heating and spontaneous combustion. For example, materials soaked in linseed oil may ignite spontaneously. Some materials ignite on coming in contact with water, for example, sodium, or with air, for example, phosphorous. Many materials are strong supporters of combustion and their presence intensifies a fire. Oxygen itself is the prime example, but peroxides, chlorates and similar materials fall into the same category.

115. For a loss prevention point of view materials which in certain conditions give off toxic gases or vapours, together with poisonous and corrosive substances and compressed gases, may augment the damage which fire itself does if they are involved in the outbreak.

Textiles

116. Cotton, jute, flax and wool, the main textile fibres, are all readily combustible and are capable of spreading an intense fire rapidly, though wool burns more slowly than the others. Of the man-made fibres, rayon is the most hazardous but nylon, terylene and acrylic fibres will also burn and contribute to the intensity of a fire. At all stages of the conversion of raw materials to the finished textile products the fire risk is present. The machinery used is capable of initiating fire through the overheating of bearings and through friction sparks caused when tramp metal and other hard objects become involved in the process. Fire can be spread rapidly, not only by the materials being processed and the stores of raw materials and finished products but also by the textile fly adhering to all surfaces of the plant and buildings and by timber floors which become soaked in oils as time goes by. The finished products of the textile industry include cloth for clothing and furniture upholstery, as well as furnishings such as curtains and carpets. In view of the speed with which fire will grow, once started, in the textile processes, automatic means of extinguishment are necessary to safeguard the business. An automatic sprinkler installation is strongly to be recommended.

Plastic materials

117. Plastic materials have an increasingly wide variety of uses. Most are very readily combustible, particularly the foamed plastics, the commonest of which are made of polyurethane and polystyrene, and are mainly used in furniture, as packing materials and also for thermal insulation against both high and low temperatures. Polyvinylchloride (PVC) is less susceptible to ignition and burns more slowly. However the products of combustion of PVC are corrosive. Most plastic materials emit large volumes of dark smoke when on fire, which makes fire-fighting difficult and more dangerous than when older, more traditional materials are burning.

Paints

118. The ingredients of many paints are combustible. In particular, the following materials in paint manufacture are hazardous: solvents and thinners; coating materials such as cellulose nitrate and cellulose acetate; and drying oils, such as linseed oil, which may cause spontaneous heating and ignition. The other main ingredients are the plasticisers and the pigments, which also are combustible.

Printing

119. Paper and printing inks are the principal materials used in the printing industry. Printing inks use flammable solvents and should therefore be treated in the same way as the flammable liquids discussed above. Paper stocks in bulk do not burn readily but are very susceptible to both fire and water damage. Bulk stores of paper and of printing inks should be kept in a separate building from the printing works. Large quantities of waste paper are produced in printing works. Offcuts should be swept up continuously and removed from the premises to a waste paper store, separated from the works, at frequent intervals.

Timber

120. The sawing and shaping of timber produces large quantities of sawdust and wood shavings which may be easily ignited by stray sources of ignition, in particular, carelessly discarded cigarettes or sparks from electric motors driving the mills. There is a danger that sawdust may collect around electric motors in sawmills, obstructing the cooling fans and thereby causing the motors to overheat. This may possibly lead to ignition of the sawdust and shavings. Wood preservatives are usually based on flammable solvents and should therefore be subject to the same precautions as the flammable liquids.

Chemicals and fertilizers

121. A wide variety of chemicals may be imported for industrial purposes and for use as fertilizers and insecticides, often under trade names, so that their composition and hence their properties are not divulged. It is important that their properties should be known at the earliest moment so that appropriate storage arrangements may be made for them. In particular it is important to know how one chemical will react in contact with another. For example, some fertilizers form explosives when mixed with other materials.

Engineering

122. Some developing countries are assembling the products of the engineering industries of developed countries, for example, automobiles and agricultural machinery. As in practically every industry, flammable liquids are likely to be widely used, in the form of cleaning fluids and paints; in addition, there is likely to be an abundance of combustible packing materials and, in vehicle assembly, upholstery materials. Precautions have to be taken in bulk storage and in the use of all flammable liquids. Packing materials and other wastes need to be collected and disposed of safely at frequent intervals.

Foodstuffs and cereals

123. The main fire hazards associated with foodstuffs and cereals are dust explosions, wherever foodstuffs are ground or milled, and the risks associated with the extraction of edible oils. Most oils are extracted from a vegetable or nut with the aid of solvents, many of which are flammable. The oils themselves may be susceptible to spontaneous combustion.

Warehousing

124. Precautions need to be taken to prevent the outbreak or spread of fire in warehouses and to minimize the loss should fire break out. Materials arriving by ship at ports and by railway and road transport at warehouses or factory sites should be transferred to safe storage areas as quickly as possible. Safeguards should be instituted to prevent the ignition of the goods during the transfer. Goods left lying around on the dockside or on unloading areas are exposed to stray sources of ignition, such as carelessly discarded cigarettes. Mechanical handling machinery powered by petrol and diesel engines may also be a source of

ignition and safeguards need to be instituted to ensure that engine exhaust pipes cannot cause an outbreak of fire. Within the storage areas strict supervision should be maintained over all potential sources of ignition, such as smoking, electricity, lights, power units and mechanical handling machinery. All dockside, transit and factory warehouses for the storage of incoming and outgoing materials should be subdivided with a view to limiting the size of a loss in the event of fire and also to provide facilities for segregating commodities according to their fire hazard. Strict control measures should be in operation to ensure that commodities are stored in the warehouses which have been allocated to them according to their nature.

Transport

125. Goods in transit by rail or road transport also need to be safeguarded and the same principles apply as in warehousing: control of the sources of ignition and segregation of commodities according to their fire hazard. Outstandingly hazardous commodities, such as flammable liquids, should be clearly labelled, with an indication of the precautions which need to be taken.

Fire extinguishing equipment

126. The early discovery of a fire and an immediate attack upon it are major factors in the minimization of loss. Every business should have a plan to ensure early discovery of the fire, sounding of an alarm and the calling of fire-fighting teams to the scene of the fire. The value of an automatic sprinkler installation has already been mentioned. The sprinkler system employs a network of pipes connected to a water supply by a special, automatically operated valve. The whole floor area on each storey of the building can be sprayed from sprinkler heads fitted at fixed intervals in the pipework, usually at ceiling level. The sprinkler heads are kept shut by means of heat-sensitive mechanisms. On the outbreak of fire the rising column of hot air operates the mechanism in the sprinkler head most immediately above the fire. Pressure is released and the main control valve opens, allowing water from the supply to discharge through the head onto the seat of the fire. Sprinkler systems should be designed and installed according to the best practices established in Western Europe and North America.

127. Water is the best extinguishing agent, for the following reasons. Heat is the principal ingredient of fires causing and sustaining them and helping them to grow. The removal of heat is therefore the most effective method of extinguishing a fire. Water, by virtue of its high latent heat of evaporation, is the extinguishing agent with the greatest cooling properties. Whether or not a sprinkler system is installed, first-aid fire-extinguishing apparatus should be provided in the form of portable extinguishers containing water and small-bore hosepipe on reels, permanently connected to the water supply. Where the business is dependent on its own fire brigade it may also be necessary to provide heavier fire-fighting hose systems for use by the brigade.

128. The effective use of all forms of fire-extinguishing equipment depends on the training of those people who are going to operate it. This is particularly so in the case of the heavier equipment. The automatic sprinkler system, the fire-fighting hose and reels of hose must have an adequate water supply at a pressure which will deliver water onto the seat of the fire.

129. Whereas water is the best extinguishing agent for general protection of buildings, there are certain circumstances in which it may be ineffective or even dangerous to use. Since water is a conductor of electricity, it is unsafe to use on live electrical equipment. Water is also ineffective and in some cases unsafe to use on flammable liquids. The extinguisiing agents which may be used in these circumstances are foam, carbon dioxide, dry powders and halons. All these agents can be used in fixed systems, including those with an automatic operating mechanism, as well as in portable apparatus. Care has to be taken to ensure that the agent used and the method of application are properly suited to the fire risk. Guidance on this is available in publications produced in European and North American countries.

# PART THREE: MARINE CARGO LOSS PREVENTION[5/]

## Chapter I

## THE RESPONSIBILITIES OF SHIPPERS AND CONSIGNEES

### Packing and packaging

130. The safe transit of goods is clearly of great importance to their seller, who is often also their manufacturer and is generally the shipper, and to their buyer who is generally also the consignee. This is particularly true when maritime transport is involved. Having sold his goods to a foreign buyer, the seller wants to ship them to the consignee in a safe and expeditious manner. If loss occurs, particularly a serious loss, even full insurance cover cannot offset all the adverse effects of that loss. Sellers may lose future sales, for instance, if they fail to pack their merchandize properly. Perhaps one of the first rules a shipper must learn is the absolute necessity of providing suitable packing, i.e., packing designed for the conditions of transport and incidental storage, which will ensure delivery of the goods in sound condition.

131. One of the most serious errors is the frequent assumption that packing for domestic shipments within a country is also suitable for export shipments, an assumption with very regrettable consequences. The handling, storage and transport of export shipments are quite different and more hazardous. Depending on the particular cargo, the packing specifications will vary. This is where cargo loss prevention recommendations come into play. It is also where the underwriter can exert influence on the shipper. Even if the shipper realizes he has to upgrade the packing, he may try to hold down the extra costs by skimping on the quality of the packing.

132. Within the crate or other form of packing, the cargo may need additional bracing or cushioning material. The movement of a ship sets forces in motion that are utterly different from those encountered in shipment of goods by road. Ships will pitch, roll, rock, plunge, etc. In the course of a single trip, a ship and its cargo will experience these motions peculiar to the sea for hours or days on end on several occasions. Imagine an improperly cushioned cargo which may chafe and rub against the packing again and again and again. If it is a heavy item, such as a piece of machinery, whose weight is shifting back and forth continuously, it can pick up considerable momentum. Lacking proper bracing, the machinery could rear loose and smash itself into scrap metal against a bulkhead or against other valuable cargo.

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5/ This part was prepared with the assistance of Messrs. T.O. Clark, Chairman of the International Union of Marine Insurers (IUMI) Cargo Loss Prevention Committee, New York, and Fathy Youssef, Manager of the Cargo Supervision and Surveying Office, Alexandria. It contains many passages from an IUMI brochure entitled Cargo Loss Prevention Recommendations, and from papers read at the Afro-Asian UNCTAD/UNDP/SIDA [SIDA = Swedish International Development Authority] seminar on Loss Prevention, held in Madras in December 1979.

133. The packing must usually include some form of waterproofing, the degree or extent of which will depend on the type of cargo being shipped. Domestic shipments suffer fresh-water damage in the form of normal rainfall. Export shipments also are rained upon, but they may be subject to typhoons, monsoons and hurricanes, much more intensive storms with heavier precipitation driven by stronger winds. Further, they can suffer salt-water damage from ocean spray and waves breaking over the deck at points where the sea water can find its way into the cargo. There are many kinds of water protection ranging from tightly sealed special containers to shrink-wraps. Shrink-wraps consist of sheets of plastic cloth which are stretched over, under and around a shipment. An impervious wrap is formed which will keep most water out. It may not be suitable for all cargoes, however. It will also keep moisture in. So, if there is some moisture inherent in the cargo or condensation on a metal component, it will not dry out and hence mould or rust may form. It is necessary for a cargo to be absolutely dry before shrink-wrapping or for a drying agent to be inserted within the wrap. Another consideration in regard to any shrink-wrap is that, if a tear occurs and water enters, it will hold the water much like a plastic pitcher. Under a driving rain or boarding seas, such a torn cover can literally fill with water, with serious consequences to the cargo. Yet, shrink-wrap is very satisfactory for many shipments. Again, it is a question of knowing the particular peril and the appropriate remedy.

134. Many ports lack deep-water berths or protected harbours, forcing ships to anchor off-shore and entailing the use of lighters to move goods from ship to shore. Such lighterage multiplies the handling of the cargo and substantially increases the risks. A well-designed packing is essential in such circumstances. And the well-designed packing comes in an increasing variety of forms. There are fibre-board cartons, nailed wood boxes, wood crates, wirebound boxes and crates, cleated wood boxes, steel drums, fibre drums, barrels, casks, kegs, shipping sacks, bales, plastic bags, plastic drums and burlap bags, just to mention those most commonly used. Each container has its advantages or disadvantages, depending on how it may be used.

135. To give an example, caustic chemicals are often successfully shipped in plastic drums, but this form of packaging proved most troublesome when used for shipment to a port in the Arabian Gulf. The drums stayed on the deck of a ship under a blazing sun and in time they softened and began to leak. In addition to the loss of the cargo in the drums, the ship's deck began to suffer considerable damage. Since there was no other means of preserving the cargo, the entire shipment was jettisoned.

136. Even metal drums can deteriorate, so it is important to be sure that the contents of a container and the container itself are compatible. It is equally important that this compatibility will persist during loading, unloading and movement in the course of transport, while the cargo may pass through different climatic zones, temperate to cold to hot to humid. Each extreme of temperature or humidity can be a cause of loss. Condensation can form, bulkheads will sweat, and freezing can ruin contents just as easily as high temperatures. Whatever type of packing is used, it must be capable of being stacked rather high without collapsing, bursting, or crushing its contents. Simply stated, a keg designed to hold 50 lbs. of nails may also have to support 10 similar kegs stacked on top of it without the 500 lb. burden causing the base keg to come apart and the whole stack of kegs to collapse.

137. Additionally, the packing must be able to withstand the hazards of loading and unloading. Starting with the simple longshoreman's hook, which is very useful in securing a grip on a bale of cotton or a wooden box, it is easy to imagine what can happen when the hook pierces a plastic container with a dangerous liquid in it, or a paper bag with sugar in it. As a more sophisticated example, one can find instances of fragile machinery being lifted with chains instead of canvas-type slings and of boxed cargo being pushed off loading docks rather than being lifted off.

138. Designing a new packaging technique is not enough. The package should be tested for strength, durability, handling practicability and resistance to the hazards it is likely to encounter on its scheduled trip routes. For instance, how well does it take being dropped on its side, edges, and corners; rolling down a flight of stairs; vibrations; pressures; exposure to weather; etc. Random inspections should be made of the packaging to establish that proper packing procedures are being followed and the quality of the packing itself is not being compromised. Once a new packing design is utilized, arrangements are often made to have a surveyor at the point of destination examine the unpacking of a cargo, so that the condition of the cargo may provide a clear sign of the success of the packing. If there has been a failure in any way, its cause can be ascertained and corrective measures taken to improve the packing.

139. There are two key words to remember: susceptibility and damageability. Susceptibility refers to the ease with which a cargo can be damaged. Damageability refers to the extent to which it may be damaged. Ceramics are easy to damage and tend to suffer extensive damage. Coal is not easy to damage but if spontaneous combustion were to occur extensive damage could result before the fire was extinguished. The nature of the cargo and its special characteristics should therefore be considered in each case. Is it fragile? Can moisture hurt it? Odour? Is it compatible with other cargo or not? Two chemicals may be harmless while separated but on contact with each other will flare up, explode, or produce a toxic gas.

140. It may be appropriate to consider at this point the question of who should be responsible for devising, designing and introducing suitable packing rules. Normally, shippers should be in a position to know the minimum standard of packing to be used for the various types of goods which they are accustomed to handle and their recommendations are quite reliable in most cases. Yet, there are shippers who will skimp on packing to reduce costs. One cannot deny that expense control is as important as loss control in any shipment. To exaggerate the protection beyond what is widely held to be adequate is a waste of money. The new shipper, especially in a developing country, can seek advice from packing engineers and laboratories as well as reliable export packers, who can help to establish levels of packing adequacy for each product shipped.

141. As regards its exports, the Government of a developing country can have considerable influence in recommending adequate packing. Although it may not have the same power to influence how its imports should be packed, it can specify that goods purchased abroad be packed properly and be shipped in a manner suitable to the country's domestic transport system, so that on arrival the cargoes can be handled reasonably well. In developing countries where governments directly control the sale and purchase of goods in foreign trade and their transport system, incentives to observe proper packing can be very effective. In other countries

where these functions are in the hands of private industry, the incentives may not be quite as direct but governments can still recommend correct procedures through directives and educational programmes. Further, industry itself can and should be expected to adopt the best packing techniques consistent with needs and economics.

Cargo identification through marking etc.

142. Proper identification of a shipment is also of the greatest importance. It ensures that the cargo will follow the pre-determined trip route and that the consignee can distinguish his cargo on arrival at its destination from that of others. The shipper should set up and follow a reliable system for marking his shipments. In addition to the external casing, the products within each package should be marked, if possible, to facilitate identification if the casing itself is destroyed or mutilated. Internal markings also are a safeguard if the package is opened during transit against inferior products being substituted; furthermore, if stolen merchandize is recovered, they can help to restore it to the rightful owner by accurately identifying him through the shipping marks.

143. It is not unusual to find second-hand or used materials being utilized for packing or to find cargoes that have just arrived being shipped onward in their original packing. When this occurs, the shipper should remove or obliterate old labels and old marks and apply clear, new markings. Whether using new or used packing, the shipper should be sure to advise the consignee and any intervening carriers of the new markings. It may be prudent to make such markings in two languages, one being that of the country of destination.

144. Use of symbols can be more effective than words, especially where a shipment may be handled by a series of workers schooled in a variety of tongues or even by some who are largely illiterate. There are a number of picture symbols which are internationally accepted and understood, through the work of the International Organization for Standardization (ISO). Some other symbols are also officially recognized within certain countries. When shipments of hazardous materials are involved, there is another set of picture symbols recognized internationally through the labours of the United Nations. These symbols are used in connexion with poisonous gases, explosives, highly combustible materials and radioactive substances, to name a few of the items to which these symbols apply.

145. There are many interesting examples of mis-marked or misunderstood identifications on shipments. One chronically bad situation arises with products such as rubber or coffee. It is not unusual when unloading a vessel to find that the sacks at the bottom of the load have been subjected to so much weight, pressure, heat and moisture that the markings have become completely illegible. Even though the contents were as sound and pure as those of the top sacks, consignees have been known to reject shipments on the basis of failure to prove they were the same as shown on the pertinent documentation.

146. Another example relates to a crate of machinery that was definitely known to have been loaded aboard a ship. On arrival at destination, with no other ports of call in between, the crate was not to be seen anywhere in the hold. Six months and twelve voyages later, the crate was found aboard ship in perfect order, with all marks clear and correct. It had been placed in one of the ship's storage compartments rather than the hold, because someone had thought it was a spare part for the ship's engine-room instead of part of its cargo.

Use of containers

147. Containers come in a variety of designs to serve different purposes. They range from 5 feet to 40 feet in length, with capacities of from 12,000 lbs. to 55,000 lbs. There are containers for dry cargo, refrigerated, dry and liquid bulk, livestock and automobiles, to name the more commonly used ones. The advantages of containers are numerous but, primarily, they permit point-to-point shipments with the cargo well protected and secure within the containers and they offer ease of handling and uniformity of units for compact stowage on vessels. However, containerization does not eliminate the need for cargo protection. Any assumption that the container is a substitute for adequate packing or for safe stowage and handling is an invitation to difficult times. The perils discussed in regard to packing in general, throughout this study, apply in the main to containers equally. Containerization is a more sophisticated form of cargo-handling that requires very special equipment to lift up and put down big boxes and to transport them on sea and over the road. Moreover, it is not suitable for every trade.

148. Where containers are employable, the shipper should inspect each container before use for cleanliness, soundness of construction, security of doors and water-tightness. Cargo must be export-packed, carefully stowed in the containers and put under seal. Seals come in a number of types but the most common are simple plastic or metal wires which are run through the bolting mechanism of container doors, after which the ends of the wires are fused together in a sealing lock. The seals are numbered and the principal purpose of the seal is to show if anyone has attempted to enter the container. If the seal has been broken or if the seal's number differs from the recorded number (indicating the original was broken and replaced with a new one) there should be suspicion that a theft may have occurred. It is an important rule, therefore, to examine seals carefully on arrival. The use of a seal also enables the consignee to make a claim against the carrier, in appropriate circumstances, for delivering cargo with outward evidence of tampering.

149. In recent years, new high-security seals have been introduced. They either comprise a very heavy cable lock or bear the appearance of a padlock. They can be used only once, since at the trip's end they are cut off with large bolt cutters and thrown away. They cost about $US 5 to $US 10 each but are considered worth it when used on a container carrying highly valued cargo. Unlike the simpler wire seals, these high security seals also protect the container from being opened too easily. Unfortunately, professional thieves have developed methods of entering containers through the doors with almost no visible evidence of such penetration - yet another reason why it is essential that consignees examine containers carefully before accepting them from shippers.

Choice of carrier

150. The shipper should devote much attention to selecting the right carrier to move his cargo. Carrier services and operating practices vary. Those carriers who are interested in cargo protection, good handling and careful stowage merit a shipper's support. Superior carriers should have a positive programme for cargo protection and should make periodic reviews of their cargo-handling procedures. They should maintain regular guard service on piers and have guarded areas where valuable or damaged cargo is stored. There should be special stowage aboard ship

for valuable cargo. Modern loading and discharging equipment should be available for any cargo that needs special handling. Their ships should have appropriate ventilating equipment to prevent condensation of moisture in the holds that might cause sweat damage to cargo.

151. The carriers should issue and accept proper and reasonable receipts for goods which they receive and deliver. They should exercise their right to take exception to obviously damaged cargo prior to loading. A reasonable policy towards claims is one of the characteristics of good carriers. They should accept responsibility for loss or damage attributable to improper handling, stowage or inspection while the goods are in their custody. Recoveries from those who were responsible for loss of or damage to goods will reduce the net loss payable by the insurer and thereby minimize insurance costs, which are included in delivered costs of goods. Also, the fixing of responsibility promotes future cargo protection. Those who are not held accountable are not usually concerned to prevent loss.

Action by consignees

152. The consignee benefits from cargo loss prevention by receiving his goods in sound condition at minimum insurance rates. He, too, has a part to play in protecting the merchandise; he can supplement in important ways the efforts of shipper, carrier, and insurer to achieve this objective. At the point of destination of a shipment, the consignee can act in the interest of all the parties who are c ncerned with a successful transaction. Prudent selection of customs broker, inland carrier and surveyor is expected of the consignee. When in doubt, it is always best to consult with his insurer's agent or the agent of a national underwriters' association.

153. Delay in taking delivery and unnecessary exposure of goods increases the dangers of theft and damage. Taking advantage of "free" time in customs to avoid warehousing costs may prove to be an expensive choice. The consignee should arrange with the shipper to send shipping documents promptly; on arrival of the documents he should make preliminary arrangements to receive and tranship the goods. He should also anticipate difficulties regarding import licence, exchange control or other regulations that may cause delay in taking delivery. The consignee should note clearly on any delivery receipt for goods that he takes into his charge exceptions regarding the actual condition of the goods as delivered. Damaged goods should never be removed to one's warehouse without having recorded the damage on the delivery receipt (or having had underwriter's representative examine the goods).

154. For the above purpose, the consignee should inspect the goods and report damage or non-delivery immediately to the insurer's claims agent. He should invite the carrier or other bailee to attend a survey. It is important to follow the instructions of the claims agent and file claim against the carrier and/or port authority or other bailee in the event of loss or damage. This should be done without delay, even if the full extent of loss or damage is not yet apparent; details can be supplied later. The consignee should keep the underwriter's agent fully advised. The carrier must not be allowed to delay investigation beyond the legal time limit for suit and thereby avoid payment of losses.

## Chapter II

## LOSS PREVENTION IN PORTS

### Losses due to theft and pilferage

155. In a port, loss of cargo is usually attributable either to damage through handling or to pilferage. In many cases, damaged containers - often they have been unable to sustain rough handling in consequence of inadequate packing - facilitate pilferage, so that the two causes of loss may co-exist and result in an aggravation of the initial loss. Reliable surveys show that nearly 70 per cent of cargo losses are preventable, and that out of those preventable losses 50 per cent are related to theft. It is clear therefore that security must play a principal role in loss prevention action in ports. The theft of cargo is a serious threat to the reliability, efficiency and integrity of a country's commerce. Such losses erode profits, result in higher prices for consumer goods and nourish other unlawful activities

156. Certainly, a developing country is in no better position than any other to withstand such economic setbacks and should make the maximum possible effort to institute an effective anti-theft plan. It is, of course, for each country's authorities or leaders of industry to determine what means would be effective in their areas of concern and within their financial capacity to afford. Each situation requires individual analysis, since different conditions present different problems. There are, however, a number of basic considerations which should be the starting point of any reliable security programme. They are offered here as general propositions, since an exhaustive technical report would require volumes. For a more detailed explanation of security measures, there are ample reference works and voluntary consultative organizations of professional security advisers exist throughout the world.

157. Premises usually contain storage areas, transhipment terminals and loading and unloading points where cargoes are moved in the course of transit or held temporarily. They may be open, unroofed areas, shed-like structures with roofs but no walls or fully-enclosed buildings. The latter should be constructed of materials sufficiently solid to keep out thieves. All entries should be equipped with locks and windows with wired glass or bars as well. The stronger the protection, the more secure the premises will be. Alarm systems for the premises might be considered.

158. To deter thieves it is always a wise decision to install chain link fences of sufficient height around all premises and to top them off with several strands of barbed wire. Barriers should be placed along the fence to prevent vehicles from crashing into it and damaging it. It should be made impossible for trucks to back up against the fence, thereby providing an easy way of using the truck roof as a step-ladder over the fence. Every fence requires one or more gates. The fewer the gates, the greater the security and control of the premises within. When there are many gates it is more difficult to supervise all entries and departures. Gates should be of strong construction and kept closed except when actually in use. Heavy duty locks should be used.

159. Large or busy terminals usually have full-time uniformed guards at the gates, housed in gate-houses. The gate-house should allow the guards to have unobstructed views of the gate area. They should be equipped with appropriate communications equipment. All vehicles or pedestrians wishing to pass through the gates should be

stopped, examined and cleared before being allowed to pass. It is important to maintain clear separations between parking areas for authorized vehicles, for those of employees and for those of customers. Generally, customer's cars should not be permitted within the fenced area. If employees are allowed to park in the area, it should be at a reasonable distance from the truck loading area, to prevent misappropriated property being transferred to private cars.

160. The entire security area should be well lighted at night and all lighting fixtures should be protected against damage by vehicles and vandals. Key control is as important as good locks, if not more so. A key in the hands of a thief is an open invitation to losses. Distribution of keys should be severely restricted. Only those who need keys should receive them and, presumably, they have been found trustworthy. All keys kept on the premises should be held in secure, locked compartments.

161. Assembling the physical equipment for a security programme is only half the job. The establishment of appropriate operating procedures is necessary to get the most protection from the equipment. All personnel who have any access, directly or indirectly, to cargo areas must be thoroughly screened for reliability and trustworthiness. Their histories should be known and verified, especially as to any past criminal activities. The screening process must be even more demanding for employees placed in positions directly related to the security of the cargoes, especially those who are members of the security force. The security staff should be trained and closely supervised at all times in order to maintain high standards. All employees should be made aware of the importance of security. They should be instructed to comply with all security rules and to co-operate with the security staff.

162. Communications between the security chief and his staff, among the staff and among the various guard stations, as well as with local police authorities, are essential, in order to control the protected areas and achieve quick responses to trouble situations. The communication equipment may include telephones, walkie-talkies, radios, public address systems, signal devices such as sirens, gongs, flashing lights and closed circuit television. A quick means of recognizing authorized personnel would be identification (I.D.) cards or badges. They should contain enough information to prevent their use by unauthorized persons. For instance, photographs, physical description, age, signature, etc. There should be a master list against which I.D. cards can be compared, in order to identify counterfeit cards or cards that have been revoked. I.D. cards should be worn at all times while at work, since they help spot unauthorized persons quickly.

163. Movements of employees of all outside firms who provide services within the protected areas should be controlled. These may be firms authorized to serve meals to employees, cleaning and maintenance crews, plumbers, electricians, painters, etc. Their movements should be restricted to what is essential for the performance of their tasks. They should be subjected to searches on leaving the plant. All persons and vehicles entering the protected areas should register as they enter and again as they depart. All documents covering goods entering or leaving the areas should be examined as to their genuineness and, when possible, should be photographed along with the I.D. cards of the persons presenting them. Security seals should be attached to all boxed shipments and, as explained above, should be examined on all arriving cargoes to reveal if their security has been compromised during transit.

Damage from handling and storage

164. While a lot can be achieved to prevent damage to cargo and other types of loss by improving the packing design, handling of the packages at ports is also important. This is because packaging, however good, is designed to withstand the normal hazards of transportation, handling and storage, but never those arising from accidents, such as the failure of lifting machinery and damage or breakage of slings, resulting in the fall of the package from a great height. Since there is a constant pressure for cheaper and lighter packaging, improvements in handling and storage facilities are of great importance to the safety of the cargo.

165. There appears to be a general lack of statistical data that would throw light on the quantum of damages or losses attributable to the factors of improper and inadequate handling and storage. However, a detailed survey conducted by one of the leading insurance companies, based on a sufficiently large volume of business, reveals that appropximately 28 per cent of all cargo losses could be attributable to handling and stowage hazards. There is therefore considerable scope for trying to contain cargo losses by introducing good, suitable handling and stowage methods at ports. The problem of reducing losses caused by bad handling in ports can be tackled mainly by using proper mechanical handling equipment; by instituting systems of unitization, palletization or containerization of cargo; and by training dock personnel at all levels in proper cargo-handling procedures.

166. The use of the most suitable cargo gear and equipment is essential to prevent damage when loading and discharging cargo from ships. It is also well known that damaged containers facilitate pilferage and that ships seldom carry adequate supplies of appropriate cargo gear. There is thus a need for port authorities, terminal operators, stevedoring authorities, etc., to equip themselves with adequate cargo gear. Any number of instances can be cited of damage attributable to improper cargo gear. For example, an ordinary rope sling will damage at least some of the paper bags in a sling load, so broad net-slings with appropriate canvas, pallets, or net-sided cargo boards are preferable for handling cargo in paper bags.

167. Containerized cargo provides generally greater safety owing to the fewer handling operations to which the cargo is subjected. There can therefore be a tendency on the part of the shippers to underpack goods destined for containerized transport. However, in countries where intermodal transport arrangements in containers have not progressed, the containers are destuffed at the ports and if the cargo is exposed without further precautions to the rigours of onward transport by road or rail from the port to its ultimate destination, considerable damage is suffered through inadequate packaging for this leg of the journey. Container handling facilities also need to be modernized at the ports; inadequate facilities sometimes lead to damage to containers during loading and unloading operations and when containers are shifted from one place to another in the docks.

168. Some port authorities in developing countries have recognized the need to train their personnel in various aspects of safety in handling cargo, both manually and with mechanical aids. For instance, a separate training school equipped with audio-visual and other training aids has been set up by the Bombay Port Trust. "Loss prevention" forms an important element in most such training programmes.

## Chapter III

## THE ROLE OF INSURERS

### The interest of marine insurers

169. All those concerned with world trade have a common interest in the delivery of merchandise in sound condition and in the avoidance of economic waste and customer dissatisfaction at the loss of or damage to goods in transit. Marine insurers, too, are concerned with the promotion of world trade; the service which they render is to insure ships and their cargoes, thereby giving confidence and security to the owners of the vessels and the goods. They therefore have a special concern, acting individually and through their national associations and the international federation of these associations, the International Union of Marine Insurers (IUMI), to support the objective of loss prevention and all practicable programmes designed for that purpose.

170. The comprehensive brochure of the IUMI entitled Cargo Loss Prevention Recommendations, in its third edition (1974) proposes inter alia that: 6/

(a) Marine underwriters actively support cargo loss prevention by providing to it a reasonable expenditure of time and adequate financial resources, both at company and association levels.

(b) Marine underwriters appoint port inspection committees to observe handling, stowage and security practices, as well as conditions of packing of export and import shipments. Reports and recommendations for improvement should be shared with other underwriters, carriers, terminal operators and port authorities.

(c) Marine underwriters co-operate with local commercial and governmental groups as regards port operations, which are complicated and involve many commercial and official interests. Improvement of existing conditions is often made difficult by the problem of initiating action aimed at co-ordinating the many groups involved. Underwriters are vitally concerned and have substantial reasons to encourage group action.

(d) Marine underwriters support the Cargo Loss Prevention Committee of IUMI which is a useful forum for the exchange and the assembly of technical information made available by the Union's member associations. Recommendations of this Committee represent the considered opinion and findings of underwriters, loss managers, surveyors, and claims agents in all parts of the world.

(e) Marine underwriters supervise loading and discharge of "special" cargo, namely of high value goods, of commodities specially subject to theft and pilferage and of cargo that has a poor experience of preventable losses. Occasional checking of shipments and keeping records of causes of losses may lead to tangible improvement of loss experience.

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6/ Op. cit. (Recommendations to underwriters), pp. 33-35.

(f) Marine underwriters insist on adequate investigation of causes of loss by using the services of surveyors and claims agents.

(g) Marine underwriters make the strongest effort to determine responsibility for loss and to secure recovery from any custodian of cargo who may be held responsible, whether it be carrier, port authority, terminal operators, or others. In many parts of the world it is essential for underwriters to press for a delineation of this responsibility and for the establishment of legal responsibility on the part of port and customs authorities, inland carriers, warehousemen, and others.

(h) Marine underwriters grant preferential rates to those assured whose cargo protection measures are reflected in positive results, and avoid averaging the good with the bad experience, as regards for instance packing practices, shipping methods, means of climate control, and security methods.

171. Although cargo loss prevention is generally recognized as a vital activity for saving time and money in international trade, reactions are not the same everywhere. In some countries, loss prevention work has developed into highly specialized departments within the insurance companies or fully-equipped independent offices. In other countries, a person or a small team examines daily which losses can be "prevented", on the basis of the information and statistics available. Finally, there are still many countries unaware of the necessity to put into practice the principles of cargo loss prevention.

Creation of Cargo Supervision Offices in ports

172. As already mentioned above, a great deal of the damage to cargo and loss through theft happens at ports and other terminals. Whilst some countries have well organized and well equipped ports which ensure the proper handling and safety of the transported goods, most ports - in particular, many ports in developing countries - do not have such facilities. Hence the need for special measures to prevent and minimize losses. A particularly efficient measure, consistent with and even going beyond the above recommendations of IUMI is the creation by insurers, in collaboration with the port authorities, of special offices in charge of cargo supervision and surveillance.

173. In fact, one of the main difficulties of shippers, consignees and their insurers when faced with cargo losses is that they are usually treated by port authorities, port warehouses and stevedoring services as "outsiders". The information they receive - if any - on the causes of loss or damage is often neither complete nor timely enough to permit effective action to minimize loss or have recourse against carriers and other parties possibly responsible for the losses. The creation of a cargo supervision office in a port, financed by the marine insurers and their clients and accepted by the port authority as an integral part of its administrative infrastructure, brings about a radical change and transforms the insurers into "insiders", much to the benefit of all parties concerned.

174. Instead of describing the setting up and running of a cargo supervision office in an abstract, theoretical manner, it may be more useful to do so by means of a concrete example, namely that of the Cargo Supervision and Surveying Office in the port of Alexandria, Egypt.

175. As in most developing countries, the insurance sector in Egypt faced two serious problems in its marine cargo insurance business: heavy losses due to damage and disappearance of goods at various stages of transport and handling; and the ineffectiveness of recourse action against carriers liable for loss or damage sustained by the goods whilst in their hands. Because of the impact of these problems, a committee was formed by the Egyptian General Insurance Organization to study the matter. Its report stressed the importance of setting up a non-profit-making body, whose sole function would be the investigation, prevention and minimization of losses in Egyptian ports.

176. The committee was convinced that a special office for loss prevention, if provided with the means to function properly, could in the long run, attain the following aims: benefit the insurance sector by decreasing the loss ratio in marine business and improving the reinsurance conditions; benefit the national economy by reducing marine cargo insurance premiums, by reducing the cost of imported goods, by promoting the prompt delivery of commodities and equipment, and by improving the condition in which the goods are delivered to the consignees.

177. In setting up the Office, it was of course accepted that some losses cannot be prevented, namely, those due to so-called Acts of God, although their severity can be reduced through proper rescue measures. It was also recognized that the establishment of a cargo supervision office should not be construed as exempting all other parties involved in the process of handling from taking all necessary measures to minimize losses. On the contrary, the existence of the Office should encourage the parties concerned to deal with cargoes in the proper way, in other words, to fulfil their responsibilities - otherwise the Office would have to bear the full brunt of loss prevention action. Such action cannot be the responsibility of a sole party since all parties concerned have to co-operate during all stages of the voyage; precautions must be taken throughout the transit, as every move of the goods involves a peril which may result in a loss. Loss prevention must therefore be considered as an activity incorporated in all stages of the transport of goods and not as an independant activity beginning only after the incident.

178. On the basis of the understanding outlined above, an agreement among the Egyptian insurance companies was signed in 1967 establishing the "Cargo Supervision and Surveying Office" with effect from 15 January 1968. The operations of the Office produced very good results and a few years later it was decided to strengthen it, giving it all support to accomplish its functions, and preserving its independent structure. The Ministry of Insurance therefore issued an Order in 1973 establishing the Office as a union between insurance companies based on the Law of Insurance, under the same name. This Order stipulated that the Office should maintain its autonomy. A statute was drawn up to regulate the Office's functions, purposes, administration and finance. Delegates from Egyptian insurance and reinsurance emmpanies and from the Insurance Organization were appointed to the Board of Directors of the Office. Insurance companies finance the Office and bear its expenses out of a proportion of marine insurance premiums collected every year.

179. The ministerial Order issued to incorporate the Cargo Supervision and Surveying Office specified the scope of its activities as follows:

> "The Office is to supervise and survey imported and exported goods in the ports of Egypt during loading, unloading and storage within customs warehouses or in annexed customs areas, and to attend, in co-operation with other authorities, to all formalities with a view to preventing or minimizing cargo losses."

The functions of the Office may be summarized as follows:

(a) To supervise the arrival in and departure from Egyptian ports, to record each ship's consignments listed on the manifest; and, to note detailed information on imported and exported goods.

(b) To supervise the procedure of loading and discharge of the goods to and from the ships, or floating barges or pontoons, to record all damages, and to take all necessary steps for safety and protection of the goods.

(c) To supervise the goods during transport from barges or quays to customs warehouses and the annexed customs areas until they are stored; to attend to their disposal and to record their condition at every stage and to take the necessary steps for the safety of the goods, including repairing the damaged packages or reconditioning the goods.

(d) To take the necessary steps for filing, on behalf of whom it may concern and within the legal time-limit, appropriate reservations against the party responsible for the loss.

(e) To inform the insurance companies promptly of any damage caused to the insured goods and prepare the relative detailed survey reports, describing shortages and losses and their causes, after having made all necessary records at every stage of transport from the time of arrival until clearance through customs.

(f) To resort to scientific and technical expertise in the different specializations, to conduct studies and researches in relation to the Office's activities.

(g) To prepare technical studies based on the actual handling processes in order to discover the repeated causes of damage to the goods, in order to take the necessary measures to minimize them.

180. In addition to the above-mentioned activities, the Office also acts as claims agent for 250 Arab and foreign insurance companies from different parts of the world. For these companies the Office carries out surveys of goods insured abroad by them, upon application from the consignees in case of loss or damage to the goods, and issues the relative survey reports which constitute the basis for settlement of claims. The Office also acts as claims settling agent for some of these companies by preparing and effecting settlement of the claims. It should be mentioned that in several cases where the Office was specially requested by

insurers abroad to supervise the goods from discharge (hatch surveys) from the ships until final delivery to consignees, the results obtained were excellent, there was either no loss at all, or a very reduced loss with all rights and responsibility duly reserved. The Office received several letters of congratulations and encouragement from insurers satisfied with its services.

181. The following figures show the number of ships from which goods supervised by the Office were discharged at Alexandria Port in 1978 as compared with 1970:

| Year | Number of ships | Consignments | Cargo - tons |
|---|---|---|---|
| 1970 | 1 606 | 51 404 | 3 351 104 |
| 1978 | 2 475 | 43 009 | 10 099 193 |

As regards the number of letters of protests, preliminary loss advices and final reports issued as a result of cargo supervision in the same years, the figures are as follows:

| Year | Letters of protest | Prel.loss advices | Supervisors' reports |
|---|---|---|---|
| 1970 | 15 908 | 6 540 | 5 421 |
| 1978 | 28 000 | 10 058 | 8 291 |

These figures do not include survey reports issued for foreign insurance companies, reports on final surveys at customers' sites, and reports on surveyed goods found in good condition on disposal from customs areas.

182. The quantity of work in the Office depends basically upon the spreading of insurance cover granted by Egyptian insurance companies. Compared to 1970 marine premiums, 1978 showed an increase of 433 per cent, which is indicative of the great increase in the volume of work of the Office. As a result of the increased work-load, the Office has had to increase the number of its staff. In 1970 it had 107 workers; this number was increased to 258 workers in 1978, also it had to improve the efficiency of the work by providing means of transport within the port areas, generalizing the use of modern methods and equipment for packing, repairing and binding (steel strapping machines, ropes, glue, etc.) and holding training courses for its personnel. It should be noted that, in its efforts to protect the goods, the Office lends its services to navigation companies and consignees for the repair and replacement of the damaged packing, in order to minimize the loss, before the goods are cleared through customs.

183. The establishment of the Office, from the insurance point of view, was a natural step to take since it is insurance that ultimately bears the cost of shortages, losses, and damage to the goods; hence a direct intervention was required for loss prevention. However, customs and other organizations responsible for the handling of goods in the port were at first hostile towards the Office because they feared that it would try to control them and make them liable for all losses and damage, not realizing that they would in fact benefit from the loss prevention policy adopted by the Office. Convinced that loss prevention could not

be successfully achieved without the full co-operation and participation of all parties concerned (insurers, carriers, forwarders, stevedores, customs officials and, particularly, the final receivers), the Office had to overcome the difficulties emanating from the lack of understanding, and to establish a "bridge of trust" with the other parties operating in the port, in order to create a suitable climate for co-operation.

184. In recognition of its valuable services to the trade community as a whole, the Office was granted in 1977 the privilege of its General Manager's becoming a member of the Board of Directors of the Port Organization of Alexandria. This is a great asset in the co-operation between the port authorities and the insurance sector of Egypt since the Board comprises all parties concerned in the process of cargo handling, including the Port Police. In spite of this achievement some problems and difficulties remained as many parties were sharing the work involved in cargo handling. It was felt that these problems could not be left to voluntary co-operation and individual initiatives, but should be faced and solved by the official authorities. A recent decision by the Prime Minister of Egypt defines relations between the Office and the other parties operating in Egyptian ports; this decision has to be accepted by all parties as a high level compulsory ruling.

185. The question of whether the Office's results are positive or negative can only be answered by the national insurance companies which bear the expenses and enjoy the benefits, or by the foreign insurance companies which often request the Office to undertake preventive measures in respect of shipments discharged in Egyptian ports. However, the Office's experience shows that only the physical presence in the ports of the delegates of the Office and the Office's supervision of goods in the absence of the consignees can really contribute to minimizing losses. An important part of the business carried on by the Office is the research, studies and statistics compiled on different kinds of goods which suffer constantly from shortages and damage. These studies are of great help to insurance companies in adjusting their conditions and premium rates. The Office has also turned its attention to the problem of missing parcels in the harbour area and set up a special team to trace them. This team recovered a sizable part of the undelivered parcels, for which insurance companies paid, or would have had to pay, large sums.

## Chapter IV

## REGIONAL CO-OPERATION IN MARINE CARGO LOSS PREVENTION

### Scope and limits of regional co-operation

186. As is always the case in insurance, regional co-operation cannot replace appropriate action at the national level, although it may supplement such action very effectively. In other words, countries must first take measures aimed at loss prevention within their own spheres of action, namely in respect of their own shippers, consignees, carriers, ports, etc., and then join forces to tackle specific problems requiring regional, or even interregional co-operation. The efforts of the International Union of Marine Insurers (IUMI) described in chapter III reflect this necessity and are supported by most of its member countries.

187. Among these measures, record keeping in the form of a unified, global system of cargo loss intelligence, covering causes of loss by commodities, places of occurrence, shippers and carriers involved, etc., would certainly be of great utility if operated on an interregional, worldwide basis. IUMI is urging each of its members, the national marine insurance associations, to collect such data and put them at the disposal of the other members. Furthermore, every year it conducts a comprehensive survey on every aspect of this subject, covering all parts of the world, in order to keep up-to-date on changing trends and new developments. Through this work the IUMI encourages underwriters to share their knowledge and experience with one another, as well as with the entire community of those concerned with stopping the vast and senseless waste of property and resources.

### The problem of missing vessels

188. A problem of particular importance to many developing countries is that of the so-called "missing vessels". These are mostly vessels which accept cargo for a given destination but never reach that destination. In some cases the loss of cargo is due to financial difficulties of shipowners or charterers, who sell the cargo to meet their own expenses, or who see their ship seized or arrested with cargo on board by port authorities or other third parties, such as banks or mortgagees. In other, lately more frequent, cases the loss of cargo is due to intentional fraud by shipowners or charterers, who divert the vessel from its initial route, sell the cargo and then abandon, resell or even sink the vessel - to pretend that it sank with the cargo on board.

189. Overaged vessels, operated by small, independent shipowners or charterers with marginal financial backing and invariably flying flags of convenience, are usually involved in such fraudulent cases. The best defence against them is to avoid contracting transport with unreliable carriers and to resist the temptation of the cheap freight rates that they offer. A diligent shipper should choose his carrier and not only scrutinize the carrying vessel, its age, classification, itinerary and freight terms, but also the reputation of the shipowner or charterer and his banking and other references. Unfortunately, most shippers prefer to rely on their cargo insurance to redress their losses, leaving to their insurers the entire burden of recovery by right of subrogation.

190. The problem of "missing vessels" particularly affects the trade of developing countries, and especially some areas such as the Indian Ocean and West Africa. Some Governments, alarmed by the magnitude of losses caused by such unreliable carriers, have worked out measures to prevent or limit these hazards. For instance, the

Saudi Arabian Government restricted the movement of overaged vessels trading in its ports and took several measures to discourage shipments by single-owner tramps. As regards insurers, many of their associations and federations devote increasing attention to this problem. For instance the General Insurance Corporation of India, purely as a measure of self-protection, introduced a system of approval, for insurance purposes, of tramp vessels loading in Indian ports.

191. At an African regional seminar on marine cargo insurance, held in Alexandria in November 1978 under the auspices of UNCTAD and financed by the Swedish International Development Authority (SIDA), the problem of missing vessels came up and a committee was established to investigate it. The Committee, after several meetings and exhaustive discussions, recommended the following:

(a) That this problem is a serious international problem and an international solution should be found with a view to protecting the international community of marine underwriters from this malpractice.

(b) That since the situation has not been created by the African markets concerned, it would not be fair for the international reinsurers to abandon their reinsurance responsibilities in this respect but rather they should come to the aid of the respective underwriters and join the market concerned in finding a lasting solution to the problems.

(c) That experience has revealed that the majority of the vessels engaged in these dubious activities are generally chartered vessels, overage vessels (15 years and upwards) and generally flying flags of convenience.

(d) That, bearing the foregoing in mind, the following measures should be taken:

(i) Governments should be approached to exercise more caution in issuing of flags of convenience or registering vessels flying their national flag.

(ii) A special appeal should be made to the Governments of the countries where these fraudulent ship operators originate and to institute criminal or other legal proceedings against the wrong-doers, with a view to curbing or eliminating their activities.

(iii) A special appeal should also be made to shippers, importers and buyers to ensure at all times that shipments are made in properly registered vessels that belong to shipowners of repute.

(iv) Underwriters should take adquate steps to protect themselves from the activities of these fraudulent shipowners and charterers in the following ways:

(a) Whenever possible they should cover only goods which are shipped in vessels owned by reputable shipping companies or liner vessels, or national shipping lines and that on no account should they accept to insure risks carried in vessels owned or chartered by the dubious shipowners or charterers described above.

(b) Every national insurance company should endeavour to keep a central marine intelligence unit to monitor the activities of these dubious operators and should keep the entire market fully informed.

(c) Underwriters in each country should adhere to the institute classification clause and advisory scales of additional premiums as issued by the London Market, and should also adhere to any other similar clause issued by their own domestic markets, aimed at achieving the same objective.

(v) All African Governments, especially those of countries where the impact of the dubious activities of the operators of these "missing vessels" have been most felt, should co-operate with the marine underwriters in their territories in their efforts to eliminate the adverse effect of these maritime malpractices.