Conference Paper

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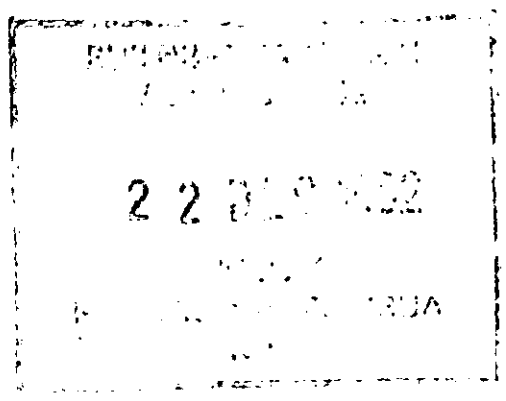
FIRE INCIDENT DATA-COLLECTION AND USE IN NEW ZEALAND



BUILDING RESEARCH ASSOCIATION OF NEW ZEALAND branz

Fire Incident Data — Collection And Use In New Zealand

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This paper was presented to the 52nd Annual Conference of the Institution of Fire Engineers (N.Z. Branch) in Gisborne on 26 August 1981.

Abstract:

The paper surveys the sources of data currently available in New Zealand on the incidence of fires with particular emphasis on the information needed for purposes of fire safety in buildings. The new data retrieval system recently introduced by the Fire Service is discussed, and other possible sources of useful data are identified. A current investigation by BRANZ into the availability and use of fire incident data is expected to indicate ways in which workers in fire safety could obtain historical data to assist in making valid decisions.

When your Executive invited me to address this conference on the subject of fire incident data I felt this gave me an opportunity to do two things. The first was to explain why the Building Research Association has an interest in this matter and secondly to talk to a group of people, a large majority of whom come from the Fire Service which is the major fire incident data collecting organisatin in this country.

Building Research Association acts as an agent of the building industry which spends large sums of money annually on construction and equipment, the need for which is dictated by fire safety requirements. These include fire resisting construction, sprinklers, first aid fire fighting equipment and other means of reducing life and property loss in fires. All these contribute to the cost of a building and since BRANZ obtains a substantial part of its income from a levy on the cost of these buildings, the fire safety provisions contribute to BRANZ income. We therefore have an obligation to take an interest in the spending of that money. One result of this obligation was that when BRANZ was established it decided to set up a Fire Research Division to work in this area of building. BRANZ spends 10% of its income on the Fire Division, which now conducts the bulk of the fire testing in New Zealand to ensure compliance with the building bylaw fire requirements. The Fire Division devotes time to researching background problems related to these requirements and one of the important things it needs to know is information from real fires.

When the BRANZ Fire Division became active in the early 1970s one of its interests was the availability of information on the incidence of fires, as clearly this can have an important influence on what should be researched. Prior to this time there had been some data published by the Department of Statistics. This information was of a fairly general nature and I assume was obtained from insurance and fire brigade sources. Somewhere about 1972 the Department of Statistics decided that insufficient use was being made of this information and ceased its publication. This was of great concern to a number of organisations but the decision was implemented despite considerable pressure from them. However, during this time the Fire Service Council was publishing information gathered from fire brigades throughout the country. As many of you will know, from this grew a very important function now carried out by the New Zealand Fire Service and this information is now published in its annual report to Parliament.

The nature and extent of the information collected by the Fire Service Council was limited by the questions asked on the form that the Fire Brigade Officer was asked to fill in. In doing so the officer was left very much on his own as to the manner in which he answered the questions. The sort of information that was recorded covered where the fire was, when it happened, something about how it happened, how long it took to extinguish and a limited amount of detail of the building and its contents. In the annual reports to Parliament there is presented information on the numbers of fires in different occupancies, the supposed cause of deaths and injuries and other general data. There is enough information now available to give some very useful historical data about fires in New Zealand and to make some comparisons with similar information overseas. However, it lacks detailed information about the equipment and materials that may have been involved in the fire and it lacks systematic definition of occupancy uses. Therefore the data obtained from that system is of limited use when one seeks guidance on specific fire safety problems in buildings. The other disadvantage was that if one wanted detailed information on a particular behaviour pattern which had not been covered by the system of analysis for the annual reporting process then a detailed, painstaking and time consuming manual analysis was required and often this was too daunting to be undertaken. Clearly it was seen that a more sophisticated system of collection and analysis was required.

In 1976 the Fire Service Commission came into being and under Part 2 of its Act the Commission is required to seek to achieve co-ordination between a number of nominated organisations in matters relating to the promotion of fire safety. Furthermore the Commission is required to ensure that knowledge affecting fire safety gained by the Commission is applied throughout the community. Clearly with this obligation in mind the Commission has been working towards the adoption of a better fire incident data collection system since it is the only organisation that has the ability to collect first hand information about all fires throughout the country. Most of you will know that the end result to date of this is that the Fire Service has adopted from the United States their National Fire Incident Retrieval System which is based on NFPA 901, and by now some of the paper war attached to this system will be familiar to many of you here today.

I imagine that the most difficult task that the Fire Service has faced in adopting this system has been for those in the field to adequately understand and to get to know how to use the coding manual. It is a very detailed document and is clearly the result of many years of investigation by the NFPA and certainly seems to cover all of the information likely to be needed for fire safety purposes. The information gleaned by the officer on the fire ground is then translated by him through to coding manual to numerical entries on the incident reporting form. This information is then suitable for transferring to computer storage and for later analysis.

I emphasise that quality control is vital to a data collection system. In this context, quality control means care and knowledge must be applied by the officer in the field to completing the form.

The Fire Service has a problem with its high proportion of small volunteer brigades. Here it is obviously difficult to motivate part-time firemen to fill in forms and to take the time and care to do it properly. I do not think it is a solution for the permanent brigade staff to fill them in for the volunteers, because they are not the johnnies on the spot. Unless this problem can be overcome, I would be tempted to omit volunteer reports from the data analysis, except for the fact that they account for about a third of all property fires, and therefore are an important element in the total scene.

The Fire Service here was investigating the establishment of a system of its own. I suspect that it found this to be a much larger task than was at first thought and I think they were very wise to take up the US system. It has several advantages, the chief being the use of the very thoroughly prepared and detailed coding system. Further advantages include the ability through liaison with the US National Fire Incident Data Centre to compare New Zealand experience within a much wider field of experience from USA and other countries that may join the same system. By using a common system, the definitions and data are on a common base and therefore can be compared. On the other hand, the net thrown over the many hundreds of occupancy categories is so fine that, with only about 7000 building fires per annum, the probability of a fire occurring in most of the categories in any year is so low as to be statistically insignificant, at least in the short term. Users of the data need to be aware of the dangers of making sweeping conclusions from such flimsy data.

As time goes by the new system operated by the Fire Service will be producing information of increasing value to the fire safety world in New Zealand. But it will have limitations, the principal one being that it does not deal with the cost of fires. This very important consideration is always being brought up in relation to the even increasing cost of fire safety measures, of the Fire Service itself, and of the losses incurred by property owners. It is essential in any long term fire safety considerations to keep firmly in mind the cost involved. It is generally believed that the fire safety provisions incorporated into buildings constructed to NZS 1900 Chapter 5 are satisfactory. Some have even said they are the best in the world. However I doubt if this is more than a gut feeling because we do not have many fires in these buildings. Most fires occur in buildings constructed prior to Chapter 5 or in those over which it has little or no control.

The absence of significant fires in Chapter 5 designed buildings does not prove its provisions work well. We do not know whether it is just luck that they have been effective when called upon, and we certainly do not know whether they are only just adequate or whether they may be excessive. In these times where there is an increasing cry from owners, and indeed the country as a whole, to be sure that we get value for money, the fire safety provisions required by Chapter 5 are being more and more scrutinised. There was an example recently of this where a city council announced suggestions to reduce the fire safety provisions in a certain type of occupancy use and here economic pressures seemed to be the prime motive. These should not be belittled as they are real considerations to many people. The suggestion drew a spirited response from the city's fire service, followed by a newspaper leader comment to the effect that if the fire safety requirements were capable of being reduced, were they not set too high in the first place? The point of all this is that we do not have many facts to go on, except that this occupancy use has notched up in recent times an average of only 9 fires per annum with no recorded deaths. Perhaps this is enough justification to show that this is not a high risk occupancy. There is certainly a need to integrate cost into any fire data collection system.

There are a number of sources from which useful data can be obtained which will increase our knowledge of fire behavioural patterns. Such sources could include the Statistics Department, the insurance industry, the fire protection industry, Ministry of Works and Development, the Coroner's Court, the Accident Compensation Commission, and overseas agencies. Because of our overall interest in fire safety, we at BRANZ have recently initiated an examination of the availability of data from all these sources which, together with a close look at the use to which more comprehensive data could be put. I will not attempt today to foresee what recommendations will ensue, but it is already evident that there is a mass of data available from these sources which, if properly collated with the incidence data collected by the Fire Service, will be of immense value to future fire safety activities in New Zealand.

Contacts and liaison with other organisations can produce useful feedback. The slides that I am about to show you were mostly prepared by the United States National Fire Data Centre based on information already collected by their National Fire Incident Retrieval System. Internationally the comparison of fire incident data has always presented very real problems. Each country has established its own system, and within large countries like the United States no doubt there were a large variety of systems with different characteristics. Not only are there difficulties with language, and understanding the terminology, but quite simple differences can create confusion. For example if we are interested in fire deaths in buildings we have to be able to identify that the death was clearly a result of the fire in the building. In most cases this can be clear because the body was found on the fire scene. However do you regard the death of a person who may have been injured in the fire and may have died because of the consequences some considerable time later as a fire death, as a fire injury or perhaps was it reported as death from pneumonia, one of the consequences perhaps of having experienced a fire? Herein lies the value of international exchange of ideas and information. There is now a considerable amount of activity going on internationally aimed at standardising definitions in order to make the comparison of fire incident data have real meaning. An important and valuable step for N.Z. is therefore the co-ordination with the US system that will now be possible.

Any fire safety provisions must have as a basis, forecasts of likely frequency of given fire events, in order to make realistic estimates of the effectiveness of such provisions. Much controversy can arise from various viewpoints as to whether particular provisions are necessary, adequate or excessive. The technology of writing fire codes and standards, of fire testing, and even of the understanding of the interaction between fires and buildings is relatively immature. Unlike some types of engineering where there are handbooks of quantitative information available for design purposes, fire safety engineering relies to a considerable extent on intuition based on personal knowledge and previous history of fire incidence. Although fire safety technology is becoming more sophisticated, there must continue to be an input of fire incident data. The current moves in N.Z. to collect co-ordinate and interpret data is making a good start. The achievement of a statistically useful volume of data will however take some years to accumulate and so this work cannot be expected to yield short term results. N.Z. is a small country and in recent years deaths in building fires has averaged 36 per annum and the number of building fires 7,000. These are small numbers in international circles and this smallness can lead to doubtful assumptions. For this reason efforts to make the N.Z. data collection system compatible with systems used in larger countries will be useful in interpreting our own results. To obtain the most effective use of all the material likely to be available, there is need for an integrated system for analysis purposes. To store numbers, and to extract them from storage to channel them into a variety of summary categories, is not seen as an adequate method of obtining useful guidance for making future fire safety decisions. The methods of analysis need careful consideration, with a need for statistical method to be allied to an intimate knowledge of the behaviour of buildings in fires.

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