INTRODUCTION

Regulatory Fire Safety in a building is currently achieved solely by physical features. However, 'intangible' matters such as the fire awareness of occupants can be just as vital, but are currently not taken into account because of problems of enforcement. This article explores ways in which this problem could be overcome, and hence foreshadows added ways in which fire problems in renovating historic buildings, can be tackled. If 'intangible' measures can be accepted, authorities should be able to reduce, selectively, some traditional building regulations standards. Intangible topics have probably not been explicitly considered hitherto, because of the difficulty of enforcing them; but ways of overcoming this problem are outlined below.

This approach arises in part from a belief that fire is a problem which can be tackled by a rational design process. Arguably, it is more important to tackle each aspect of fire origination, fire spread and fire fighting to an extent carefully tailored to the case in question, than to insist upon certain arbitrary quantitative levels. In this regard, it is logical to try to include any intangibles which are known to be important in achieving fire safety - such as regular fire awareness training.

The procedures outlined are not seen as any easy panacea, but it is envisaged that they could be useful in cases of difficulty, such as when
conflicts arise between the requirements of fire safety and those of historic building preservation.

A SAMPLE PROBLEM

A man is allowed to occupy his historic terrace house, as a house, just as it is. He is, for example, allowed to deep fry chips on the ground floor whilst his family sleeps upstairs, even though this combination of activities represents a relatively high fire hazard.

If, however, he uses his building as an office, then it seems from the statistical data on fires that a fire is less likely to occur than if he uses it as a home (perhaps because there is less cooking). Moreover, fire deaths are much less likely to occur (because there are fewer fires; and, perhaps, because there is more chance of fires being curtailed early, and more chance of people escaping - both, probably, because there are far fewer people sleeping in an office than in a home). However, despite the lower fire hazard, we find that it is compulsory to incorporate many fire protection features, at considerable cost and to the detriment of the historic nature of his terrace building, in order to convert it to office use: a lower hazard, but a requirement for more fire protection!

This predicament is typical of that experienced by every architect, fire protection engineer and developer involved in renovation work.

SOME FACTS

With reference to the table 'Fire Resultant Deaths and Injuries', the clear preponderance of fire deaths and injuries occurring in homes rather than,
<table>
<thead>
<tr>
<th></th>
<th>DEATHS (INJURIES)</th>
<th>1976-1981</th>
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<tbody>
<tr>
<td>Dwellings</td>
<td>3 (73%)</td>
<td>12 (74%)</td>
</tr>
<tr>
<td>Flats</td>
<td>5 (13%)</td>
<td>1 (21%)</td>
</tr>
<tr>
<td>Factories</td>
<td>2 (21%)</td>
<td>- (21)</td>
</tr>
<tr>
<td>Shops</td>
<td>1 (5%)</td>
<td>1 (12%)</td>
</tr>
<tr>
<td>Service Stations</td>
<td>- (9)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Offices &amp; Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Premises</td>
<td>3 (8%)</td>
<td>- (5)</td>
</tr>
<tr>
<td>Schools &amp; Colleges</td>
<td>- (2)</td>
<td>- (1)</td>
</tr>
<tr>
<td>Hospitals, Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homes &amp; Hostels</td>
<td>1 (-)</td>
<td>- (2)</td>
</tr>
<tr>
<td>Hotels, Motels,</td>
<td>- (3)</td>
<td>2 (7)</td>
</tr>
<tr>
<td>Guest Houses &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boarding Houses</td>
<td>- (2)</td>
<td>- (4)</td>
</tr>
<tr>
<td>Recreation &amp;</td>
<td>- (2)</td>
<td>- (4)</td>
</tr>
<tr>
<td>Entertainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles</td>
<td>1 (15)</td>
<td>2 (13)</td>
</tr>
<tr>
<td>Caravans, Mobile</td>
<td>- (2)</td>
<td>- (-)</td>
</tr>
<tr>
<td>Food Stalls</td>
<td>- (3)</td>
<td>- (-)</td>
</tr>
<tr>
<td>Outbuildings &amp; Land</td>
<td>- (3)</td>
<td>- (3)</td>
</tr>
<tr>
<td>Totals</td>
<td>16(156)</td>
<td>20(159)</td>
</tr>
</tbody>
</table>
say, in offices could be seen as a vindication of the higher standards
required in offices. Equally, however, it may be seen as a reflection of
the greater hazard and variety of home activities than office activities.
By examining the figures, and working from experience of real fires, it is
considered that there is more truth in the latter suggestion. In other
words, it is suggested that if the standards required in offices, as an
example, were reduced to be comparable to those required in homes, then any
rise in the number of fire deaths and injuries in offices would not be
significant.

(This assertion cannot be readily proved or disproved, because if
Regulations were amended now, it would take many years before a significant
proportion of the stock of properties would incorporate the new standards.
So, for all we know, the relatively low figures for fire deaths and
injuries in offices, for example, may be a splendid heritage of decades of
prudently high building standards. But this author believes that the low
figure is far more due to the inherent relative lack of hazard in offices.)

ANALYZING THE ANOMALY

This anomaly between the requirements of home and commercial standards
tends to imply that either our standards in the commercial area are too
high; or our standards in homes are too low. Alternatively, the
implication is that these two categories are not, for some reason, to be
seen as being on the same scale.
The logic behind this regulatory anomaly is, apparently, that people may look after themselves in their homes (although they still have to comply with electrical safety requirements, for example) because no politician is prepared to legislate for much compulsory expenditure on fire safety within the home; but, on the other hand, people who come to work in someone else's office must be entitled to a certain minimum standard of fire safety.

Many people might believe, in the light of the statistics on fire deaths and injuries in offices, that the fire safety standard required in small offices, where there is no risk whatever of a 'towering inferno' type incident, is costing too much. (Indeed, concern is being voiced in relation to other occupancies, too, that expenditure on fire protection may have passed the economic optimum point.)

The existence of anomalies of this type illustrates that we do not have a single standard of fire safety. So we have a precedent for varying the standard in response to legitimate pressures. So it can be argued that we should be prepared to accept lower standards of fire safety if, say, this is the only economic way to allow an historic building to be preserved. Less controversially, surely we should accept a package of fire protection measures with innovative features, without necessarily calling for 'cast iron proof' of each item in the package - if such an acceptance of greater uncertainty were to achieve a worthwhile objective, such as preserving an historic building. If there is good grounds for believing that a proposal is good, and if it would cost an inordinate amount to prove it, then surely we should back our judgement and forego the proof.
ELEMENTS OF FIRE SAFETY

In considering the anomaly of a lower hazard (in the office) requiring more fire protection (than in the house), it is useful to realise that the actual level of fire safety is a reflection of many factors - not just the requirements of the regulations. For example:

a) The standards actually current in any particular building may differ from the requirements of the up to date regulations. They may be higher, either due to innate conservatism or due to a conscious decision on the part of the original designers. But equally they may be lower, either due to an oversight on the part of the designers; or due to a deficiency in the original construction work; or because the requirements of the regulations have been up-graded since the building was built; or because some unauthorised alterations have been made.

b) The fire protection originally installed may have become degraded with time: holes for ducts may have impaired a fire rated wall, for example; or the sprinkler system may not have received appropriate maintenance.

c) Insufficient attention may have been paid to important details which may not be covered by regulations (or, which may not have been covered at the time of construction).

d) The fire awareness of the building occupants: a higher than normal awareness is confidently thought to be an important factor in reducing the incidence and severity of fires, whilst lack of awareness is known to have the opposite effect.
The flammability of furnishings, furniture etc. (These are not controlled under current Victorian Regulations.)

REGULATIONS
Regulations cannot tackle all these aspects of fire safety. Where they can tackle them, we must, realistically, appreciate that their practical application is uncertain. In essence, it is very difficult to frame practical regulations to cover many of these aspects and so, thankfully, this is not attempted: the difficulties of administering them on every building project would be too great.

But just because a standard is too hard to specify and monitor for compliance on an ordinary project, it does not follow that such a concept should not be incorporated into special cases: by bringing into play factors which are not normally considered, it may be possible to resolve economically many cases where fire protection causes problems.

The Uniform Building Regulations Referees are currently required by the Act to consider on merit whatever application is brought before them, and there are no restrictions upon what such applications might contain. Therefore, there is no reason why intangible suggestions should not be advanced now; and, indeed, many current Referees' determinations contain a 'maintenance clause' requiring that fire protection equipment should be regularly and properly maintained by the fire brigade. By specifying that the fire brigade shall do the maintenance, the Referees have a good guarantee that it will be done: if the owner were to cancel the maintenance contract, the
brigade would surely alert the authorities, and legal moves to ensure compliance with the Referees' determination would result.

One reason why intangibles have not, apparently, been offered to the Referees in the past, is the fact that everyone appreciates the problems of enforcement. But a possible solution to this problem is outlined below.

A BROADER APPROACH IN OUTLINE

In view of the real fact that current regulations are an uncertain means of ensuring fire safety, it is surely wrong to both insist upon strict compliance with the letter of the law and simultaneously refuse to acknowledge the contribution that these other intangible factors can make. Rather, it must be logically permissable to provide fire safety by means of a package of measures tailored to the project in question, where some of the package may be intangible measures.

The suggestion is that, in appropriate cases, the owner and his design team should incorporate into the application to the Referees proposals relating to any of those intangibles which seem appropriate, such as the fire awareness of occupants.

By incorporating intangible elements of fire safety which are not covered by regulations, it should be possible to negotiate a 'trade-off' of some regulatory feature which is difficult to provide in the case in question. The greatest problem with such a scheme would be in ensuring that any proposal in relation to an intangible will be adhered to far into the future.
For example, if one part of the proposal put to the Referees includes a statement that floor coverings will have fire-related test indices not exceeding certain values, how will this requirement be enforced when the carpet is renewed in ten years time? As another example, how will an undertaking that 'all building occupants will undergo fire awareness training at least once per year' be monitored?

ENFORCING COMPLIANCE WITH 'INTANGIBLE' MEASURES

It is difficult to enforce continuing adherence to agreements related to intangibles. Under the scheme outlined above, it will be the owner who will be proposing some agreement in respect of some intangibles; and therefore it must rest with the owner, in his submission to the Referees, to propose a form of meaningful 'guarantee'.

At a minimum, the certificate of occupancy could presumably be endorsed to indicate, for example, that

This Certificate becomes automatically invalid, and the owner and/or occupant becomes liable to prosecution, if the following special condition is not fulfilled: The occupants of the building be provided with fire awareness training, to a level acceptable to the Melbourne Metropolitan Fire Brigade, at least once in each twelve month period.

However, in practice it is doubtful that after say five years, there would be many people within the building who would still be aware of this requirement, and so this simple approach might not be a successful way to ensure the continuing provision of fire awareness training. (It is the training which is of practical importance, rather than just a legal obligation to provide training.) Thus it is likely that such a proposal, on its own, would not meet with the approval of the Referees; and so a
scheme with more 'teeth' is likely to be required. Here are some
suggestions of ways in which an owner could try to persuade the Referees
that he and his successors would continue to be earnest in their
expressions of good intent in relation to intangibles, if the Referees
agreed to accept reductions in other areas of regulatory constraint:
a) An owner could offer to pay a lump sum to the Fire Brigade
(or the Local Council), calculated to provide an annual sum
for evermore, appropriate to pay the costs of, say, two
randomly-timed 'spot check' inspections per year.
b) An owner could suggest a level of 'fine' to be imposed upon
himself by the Fire Brigade (or the Local Council) in the
event of a significant deviation from the agreement being
detected. This would presumably have to be associated with
an insurance policy or bank guarantee to cover the payment of
the fine, and some form of legal contract to 'tie up' the
entire package, including some form of arbitration to settle
any disputes.
c) An owner could offer to install a permanent, prominent notice
in, say, the foyer of the building informing the world at
large of the various non-standard responsibilities which the
owner has chosen to assume to himself - such as, say, minimum
levels of staffing with personnel trained in fire fighting.
(Such a public notice, it is suggested, would reduce the risk
of non-compliance to a very low level.)
d) More controversially, the owner might ask that he be allowed
to fulfill his obligations by simply installing a prominent
notice to inform the public that the level of fire safety is somewhat lower than that normally required. (This suggestion was made by Lord James of the UK's Royal Fine Art Commission: see Trust News, March 1979, p.15).

e) Whatever tasks of training, inspection, etc are agreed upon could be contracted out by the owner to the fire brigade. Then, any attempt by the owner to cancel the contract would result in the brigade alerting the authorities of the deviation. In a nutshell, the brigade would, perhaps, be the only body whom the authorities could trust far into the future to ensure that the relevant 'intangibles' were really going to be attended to.

PRACTICALITIES

There is currently nothing to prevent an owner incorporating into a submission to the Referees a proposal relating to intangibles, perhaps incorporating some suggestions relating to enforcement.

Of course, evaluating a package of proposals including some elements of intangible factors would inevitably be subjective and difficult. Of course it is easier to insist upon compliance with the arbitrary standards contained in the regulations. Of course there may be difficulties in transforming some elements of any package into a commitment which is adequately legally binding - but possible solutions to this are outlined above.
Thus any application of this proposed new approach should not be expected to be easy, and it will surely only be proposed in exceptional circumstances. Thus the authorities need not, it is suggested, fear a continuing avalanche of applications incorporating elements of the proposed new type.

However, the scheme does appear to offer an additional method which, in individual cases, may assist in resolving the clash between the desires for adequate fire protection on the one hand, and a sensitivity to all the circumstances of the case in question, on the other hand.