

# Guidance Note

## Proportionality and risk when carrying out FRAEWs to PAS 9980

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# 1.Introduction

This document has been produced for any fire engineers who are carrying out fire risk appraisals of external walls (FRAEWs) in order to give initial guidance on the concepts of risk acceptability and proportionality of remedial measures. Those FRAEWs would typically be carried out in accordance with PAS 9980 which recommends that any decisions relating to remedial works (or other control measures) are required to be based on proportionality. This document gives further guidance on this issue in order to help fire engineers decide whether it is proportionate to recommend those remedial measures.

This document focuses on residential apartment buildings (which is also the focus of PAS 9980), but the principles outlined could be applied to other building types.

This document is intended to be used by fire engineers who already have a good understanding of the concepts of risk, hazard and consequence as defined in conventional risk assessment procedures and therefore does not go into those issues in any depth.

It should also be noted that in July 2021 there was a written statement from the Secretary of State (supported by advice from an expert panel) which stated that the industry had been recommending unnecessary remedial works in situations where the risk did not warrant it.

The statement also referred to PAS 9980 as being a “risk-proportionate guideline” with the implication that appraisals carried out to PAS 9980 would result in a reduction in costly remediation works compared with previous approaches. It is therefore clear that there is strong support from the government for ensuring the proportionality of any remedial works that may be required to effectively address the risks.

## 2. Risk acceptability

Risk is not a binary safe/unsafe situation. In most cases, there is no way to reduce risk to absolute zero, so it is a matter of reducing the risk to a point where the residual risk can be accepted.

The HSE has extensive documentation on the issue of risk acceptability, so anyone who needs clarity on this issue could use the HSE website to research the topic. The text below is based on that HSE guidance.

The extract on the following page from HSE guidance on risk acceptability<sup>[1]</sup> shows a conventional risk triangle.

[1] Reducing risks, protecting people – HSE’s decision-making process, HSE Books, 2001

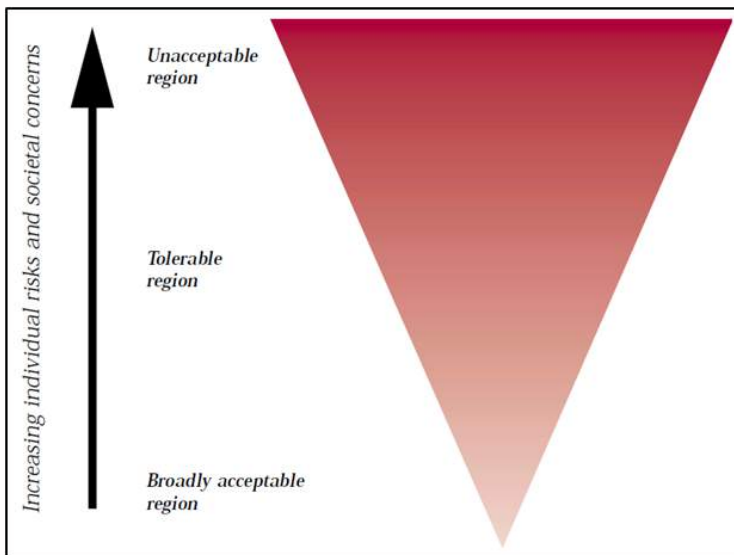


Figure 1 Extract from HSE guidance showing risk triangle.

This shows three general regions, "Broadly acceptable", "Tolerable" and "Unacceptable". It demonstrates that risk does not need to be reduced to zero (which, in practice, is not possible). Risks in the "Broadly acceptable" region are generally regarded as adequately controlled. Usually, any risks in that region would not require any further action to reduce the risks.

Risks in the "Tolerable" region show that the risks are higher than in the "Broadly acceptable" region but are not considered to be unduly high and are to be kept as low as reasonably practicable (this is referred to as the ALARP principle). In this zone, if the risks can be reduced further without disproportionate costs then that should be done, but if the only way to reduce the risk further would require costs, time and troubles that are grossly disproportionate compared to the risk reduction achieved then the risks can be tolerated. At that point the risk is considered to be ALARP, although they should be periodically reviewed to ensure that they still meet the ALARP principle. For example, if further control measures become available (e.g. new technology developed or new information becoming available) then they should be considered to determine whether the reduction in risk that would be obtained by those control measures would be worth the investment required.

In this context, costs would include financial costs of the initial works, but could include other costs such as costs of ongoing maintenance, the disruption caused by the control measures, the reduction in the usability or aesthetics of the building.

Risks in the "Unacceptable" region are not tolerable and control measures should be put in place to reduce the risk. It would still be necessary to review what options would be available for reducing the risk, and the proportionality (i.e. cost and impact on risk reduction) should still be considered in order to select the most appropriate risk reduction measures. However, in the "Unacceptable" region it is necessary to reduce the risk and if the only options for doing that result in very high costs, it is still necessary to carry them out.

### 3. Regulatory impact

In the UK there are different regulations and legal requirements for buildings that are in design and construction, compared to the regulations that apply to buildings that are in occupation.

The Building Regulations (as amended) apply during the original design and construction of the building and also apply whenever building work is being carried out on existing buildings.

Once buildings are in occupation, the main fire safety legislation that applies to lower rise residential buildings would be the Regulatory Reform (Fire Safety) Order 2005 (as amended) (FSO) and the Housing Act 2004 (HA).

In addition, for higher-risk buildings (HRBs) (i.e. residential buildings that are over 18m in height or more than 7 stories) the Building Safety Act 2022 (BSA) also requires that the building be registered with the Building Safety Regulator (BSR) and that a Safety Case be developed in order to demonstrate that the risks are being managed appropriately.

All the legislation above require a certain standard of fire safety to be achieved. However, they are not necessarily the same standard.

The text describing the functional requirements of the Building Regulations require “appropriate” fire precautions to be included in buildings, relating to issues such as means of escape, spread of flame over surfaces, control of fire spread within the building, restrictions of external fire spread and provision of facilities for the fire and rescue services. The statutory guidance as to how to meet those criteria are described in documents such as Approved Document B (ADB) for common building situations.

For existing buildings, the FSO states that the responsible person should “take such general fire precautions as will ensure, so far as is reasonably practicable” to protect people in the building. To do this, the responsible person should carry out a “suitable and sufficient assessment of the risks”. If that fire risk assessment identifies that changes are required to reduce the risk, the responsible person should undertake those changes.

The FSO was modified by the Fire Safety Act 2021 (FSA) to make certain changes and clarifications to the FSO. However, those modifications do not impact on the issues discussed above (other than that it now specially requires fire risk assessments to consider external walls and attachments).

As a result, the Building Regulations and FSO themselves do not specifically refer to the HSE risk triangle as described earlier, so further interpretation has been made on this issue in order to attempt to provide clarity on this issue.

In relation to the requirement for Safety Cases for HRBs, it should be noted that the BSR is a division of the HSE and so it would be reasonable to expect that the BSR will expect those Safety Cases to reflect HSE's approach to risk.

## **4. Differences in safety requirements for new construction and for existing buildings**

One of the issues to consider in relation to risk acceptability is the different levels of safety that are required for new buildings (under the Building Regulations) and for existing buildings (under the FSO, HA and the BSA).

Over time expectations related to safety tend to increase. New versions of design standards are produced at intervals (such as Approved Document B) and in most cases the fire safety requirements increase. In addition, over time, buildings tend to deteriorate. As a result, for new buildings it would be expected that higher levels of safety would be achieved. For existing buildings it is not reasonable to expect safety levels to meet those that would be required (or were required) for new buildings because that would often require large scale works to existing buildings every time the design standards for new buildings are increased (and would require unrealistic maintenance regimes to keep buildings in brand new condition in perpetuity).

Based on this, it would be reasonable to consider that:

The level of safety required to meet the functional requirements of the Building Regulations for new buildings and building work are likely to be approximately in line with the "Broadly acceptable" range.

The level of safety required to meet the requirements of the FSO, HA and the BSA for existing buildings is likely to be approximately in the "Tolerable" range.

This would mean that for existing occupied buildings it is not necessary to require the same standards of safety as would be required for new buildings. Conversely, it would also mean that a building that is sufficiently safe to comply with the requirements for existing occupied buildings would not necessarily be compliant with the requirements of new buildings.



## 5. ALARP

As noted earlier, if the level of risk is in the “Tolerable” range it is necessary to determine whether the risk is as low as reasonably practicable (ALARP).

In that region, it does not necessarily mean that no further control measures are required. What it does mean is that an assessment should be made of the potential control measures that might be available in order to determine:

a) What impact they would have on the level of risk

b) What the costs, time and troubles would be to implement those control measures

In this context it would be important for the fire engineer to consider various options for the control measures that might be available. That could include physical works to the external walls, but other options should also be considered such as the introduction of other fire safety precautions (e.g. sprinklers) or additional management processes to control the risk (e.g. enforcement action to prevent residents storing combustible materials on balconies).

As noted earlier that “cost, time and troubles” would typically include the financial cost of carrying out any works, but could often also include other costs such as any ongoing maintenance or management costs but would also include non-financial costs such as any potential reductions in the usability of the building that might occur, the disruption caused by the remedial works (which can in some cases cause major inconvenience and stress for residents for years) or even impacts on the aesthetics of the building.

For example, if a bin store is located adjacent to a particular façade where there are concerns regarding the risk of fire spread, one of the options for reducing the risk might involve moving the bin store somewhere else. This might have a very low financial cost to implement. However, if the new bin store location is in a much less convenient location, then that would result in a reduction in the building usability so that should also be taken into account.

For any particular control measure, if the benefits are low and the costs are high, that would be likely to be considered to be grossly disproportionate and so need not be carried out.

The decision on whether a particular control measure is proportionate is also affected by the level of risk that is present. If the risk is at the lower end of the Tolerable Risk range (i.e. nearly in the Broadly Acceptable range) then it is likely that only control measures that require a more modest cost would be justified. However, if the risk is at the upper end of the Tolerable Risk range (i.e. nearly in the Unacceptable range) then it would be expected that some level of risk reduction measures would be required unless the costs are shown to be exorbitant.

This will inevitably require the fire engineer to make a judgement on the level of risk that is present, the potential control measures that could be implemented, the reduction in risk that those control measures would create and the costs of those control measures. Some of those may be outside the expertise of the fire engineer and may require support from others in order to ensure that those judgements are correct.

In particular, the costs of carrying out certain measures may require specialist input. When considering physical works on the external wall of a building, one of the major costs can be the practicalities of gaining access to the relevant location. Typical factors might include:

- a) The practicalities of physically accessing the relevant location(s) on the façade. This would often involve working a height, and there may be various options available such as scaffolding, high reach access equipment or even abseiling. The practicalities of each of those would be impacted by various issues such as access around the perimeter of the building and the weight of the various items that may need to be carried (including the weight of any parts of the façade which may need to be removed).
- b) The practicalities of gaining access into the interior of the wall. If cavity barriers need to be reinstalled, or insulation replaced, this would often require removal of the outer layer. In some cases this might be relatively simple (e.g. if panels can be unscrewed one by one) whereas in other cases it may be much more difficult (e.g. if the panels are interlocked with each other and so can only be removed by stripping the entire façade from the top of the building downwards).
- c) If any measures require access within individual apartments, that may require liaison or approval from the residents. For example, if the introduction of sprinklers is a possible option, those would require works within each apartment and so there may be contractual issues with residents. Likewise, replacement of combustible materials on balconies may require access via the apartments.

Because of this, when the fire engineer is considering options for control measures, it may be necessary to have discussions with the client or others in order to determine the proportionality of the relevant measures.



## 6. Practical steps for fire engineers carrying out assessments to PAS 9980

PAS 9980 recommends that fire engineers assess the risks related to external fire spread as being either LOW, MEDIUM or HIGH. Whilst there are three risk categories under PAS 9980, that does not necessarily mean that those would exactly relate to the same three ranges as described in the HSE risk triangle earlier.

PAS 9980 states that if the risk is in the LOW range, then no further review would be required. Alternatively if the risk is determined to be HIGH then remedial measures will be required in order to reduce the risk.

However, PAS 9980 gives limited guidance as to what practical steps to carry out if the risk is determined to be in the MEDIUM range. In certain sections it states that the risk might only be determined to be in the MEDIUM range due to uncertainties in information. But there are no specific statements inferring that remedial works may be required in that range, which is therefore very different from the middle “Tolerable” range in the HSE risk triangle.

One approach to deal with this issue would be for the initial PAS 9980 appraisal to assess the risk against alternative risk levels such as those used in conventional fire risk assessments, as shown below.

Figure 2 - Risk levels as commonly used in fire risk assessments (from PAS 79-1 and PAS 79-2)

Risk Level	Action and timescale
Trivial	No action is required, and no detailed records need be kept.
Tolerable	No major additional controls required. However, there might be a need for improvements that involve minor or limited cost.
Moderate	It is essential that efforts are made to reduce the risk. Risk reduction measures should be implemented within a defined time period.  Where moderate risk is associated with consequences that constitute extreme harm, further assessment might be required to establish more precisely the likelihood of harm as a basis for determining the priority for improved control measures.
Substantial	Considerable resources might have to be allocated to reduce the risk. If the building is unoccupied, it should not be occupied until the risk has been reduced. If the building is occupied, urgent action should be taken.
Intolerable	Building (or relevant area) should not be occupied until the risk is reduced

Under that range, there is a possibility of control measures being required for any risks in the Tolerable range or above, although in the Tolerable range it would only be low-cost control measures that would be considered.

Based on a comparison against the risk ratings in PAS 9980 it is likely that the PAS 9980 LOW rating would be equivalent to Trivial, the PAS 9980 MEDIUM rating would be equivalent to Tolerable and the PAS 9980 HIGH rating would be equivalent to the Moderate, Substantial and Intolerable ratings.

That does mean that the PAS 9980 HIGH risk rating covers a wide range of risks, and so further clarification may be required to confirm the extent of the risk.

The risk ratings as shown in the table above do provide more breakdown of the level of risk and so may be a useful approach to take. In particular, if a FRAEW report recommends that remedial works are required it would also be necessary to clarify the risk level that would be present in the intermediate period before the works are undertaken and whether additional temporary measures should be put in place in order to protect the safety of the occupants of the building during that period.

This may include approaches such as additional management supervision, or, in severe cases, changing the evacuation strategy to simultaneous evacuation (in which case reference should be made to the relevant sector guide, "Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats" latest edition of which at the time of issue of this document is Version 4 dated 18/08/2022).

## **7. Assessment of proportionality of remedial measures**

If the risk is determined to be in the Tolerable range or higher, the fire engineer would then need to carry out a review of the potential control measures that would be available and determine whether they would be proportionate. This would require a determination of:

- a) what options there might be to reduce the risk further (this could include physical remedial works, changes management procedures or any other change that might reduce the risk)
- b) what the costs would be in relation to each of the options (those costs could include the costs of the works, but also the management costs and also non-financial costs as described earlier)
- c) for each of the options, whether the reduction in risk that would be achieved would be sufficient to justify the costs that would be incurred.

At the time of the appraisal, it is unlikely that accurate costs would be available, so the appraisal may have to simply refer to them using terms such as “high”, “medium”, “low” or similar terminology rather than specific financial numbers.

For each control measure, the fire engineer should then confirm whether or they consider that the risk reduction is sufficient to justify the cost and, hence, their recommendation on whether or not it should be carried out.

As noted above, if the risk is in the Tolerable range, consideration would only need to be given to low cost measures, whereas if the risk is in the Moderate range or higher, higher-cost measures should also be included.

If there is further analysis required in order to confirm the recommendations (e.g. the client needs to commission an assessment of the costs of a particular control measure) then that should be stated.

## 8. Inclusion of information in report

Once the above review has been carried out, the assessment should be documented in the FRAEW report (as required by PAS 9980). That should include a summary of the assessment of the levels of risk, the various control measures that have been considered, the costs and benefits of each of those control measures and the decision as to whether they would be proportionate.

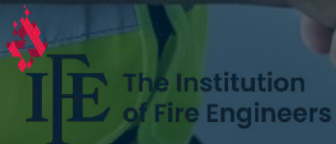
## 9. Conclusion

Risk is not a binary acceptable/unacceptable issue. It is never possible to reduce the risk to zero, so it is always necessary to accept a certain level of risk. When carrying out a risk assessment, it is necessary to review the level of risk that is present and decide whether it is necessary to carry out risk reduction measures. That decision is dependent on the level of risk, but also on the costs.



### DISCLAIMER

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