Introduction:

This note is intended to provide additional guidance on verification, construction and use of Front of Stage (*FOS*) barriers at events in Glasgow. It should be read in conjunction with the *Event safety guide* {1} and the *Temporary demountable structures: Guidance on procurement, design and use* (*TDS*) {2}.

By definition a barrier is a structural element intended to prevent people from falling and to retain, stop or guide people. *FOS* barriers should have adequate strength and stability to resist the loadings specified in the *TDS guide*. In order to function as intended, front of stage barriers should not collapse, overturn, lift or slide. *FOS* barriers should prevent dangerous crowd movements that could cause crowd collapse.

Verification:

Provision of Detailed Information to the Local Authority

In order to determine an appropriate arrangement for the *FOS* barrier(s) it is essential that a credible Risk Assessment is carried out by the Event Organiser. The Risk Assessment should include event and site specific information to verify that barriers will perform as intended during the event and will resist the design loading specified in the *TDS guide.* The Event Organiser and his specialist contractor [or barrier provider] should provide drawings, specifications, calculations, testing data and a construction method statement for the proposed *FOS* barrier. The Event Organiser and his specialist contractor [or barrier provider] should have visited and surveyed the event location in advance to assess the suitability of the site and the barrier system. Where the barrier is curved, shaped, or where thrusts are involved, full details of the layout and actual barrier section types to be used should be provided.

Certification

The Event Organiser and his specialist contractor must provide a jointly signed **Certificate of Conformity** (***CoC***) *[see Annexe A]* stating that the *FOS* barrier has been correctly designed and installed and that the barrier, as installed, can resist the design loading specified in the *TDS guide..*
The Certificate should be accompanied by a separate signed construction inspection checklist *[see Annexe B].*

Inspection

Prior to accepting the ***CoC*****,** an on-site inspection should be carried out to confirm that the *FOS* barrier has been correctly installed in accordance with the method statement and risk assessment. If the inspection highlights deficiencies in the standard of construction these should be discussed with the Event Organiser and corrective action would be required prior to accepting the ***CoC****.*

Recommendations:

Gates in Barriers

The use of Gates in *FOS* Barriers should be avoided, particularly at areas where high crowd pressure is expected.

Cable Gates

The use of sections of barrier without footplates should be avoided; where the use of such panels cannot be avoided, or 'designed out', they should be purpose designed and tested to the requirements of the *TDS guide.*

Uneven Sites

An early site visit and inspection by the Event Organiser and his specialist sub-contractor is essential so that site specific factors can be included in the barrier design and Risk Assessment.
Barriers should be placed on flat level surfaces. Where barriers are to be placed on cambered, uneven or sloping surfaces, the system should be checked to ascertain that it can perform as intended. *FOS* barriers should not be placed on sloping sites, especially where the barrier would be sited 'upslope' from the stage.
Due regard requires to be given to the effect of packing on the stability and load capacity of the barrier. Packing up beneath barriers is not recommended and should be avoided, particularly at areas of maximum crowd pressure.
Uneven surfaces should be levelled by placing a suitable fill material in order to provide a flat horizontal bearing surface for the barrier. Where this is not possible the barrier should be moved to a more suitable location.

Construction

Barriers should be properly maintained and constructed. Damaged barrier units should be rejected. Different barrier system components should not be mixed. Adjacent barrier units should be properly connected to form a single continuous barrier. Bespoke barrier units must be used at all changes in direction. Ad-hoc make up infill should not form part of any barrier at any location.

Stability

Resistance to sliding is a critical function of the *FOS* barrier. Resistance to sliding is affected by the frictional resistance between the barrier and the supporting surface and the load on the footplate. The Event Organiser or, more likely, his specialist contractor [or barrier supplier] should have knowledge of the performance of their barrier on various surfaces, based on their own tests. Barrier testing is usually carried out under controlled conditions and there is no guarantee that any given surface will perform consistently, particularly at outdoor events that are affected by weather conditions and on grass surfaces which are naturally inconsistent and unreliable. It is recommended, therefore, that the following arrangements should be adopted to enhance the sliding resistance of *FOS* barriers at music concerts, or other events involving large crowds.

i. On metal trackway, terraplas overlay [or similar products], hardstanding, concrete, block paving, asphalt, and other similar surfaces, barriers should be placed on 'thick rubber matting' (min. 5mm thick). The matting should extend over the whole width of the barrier and footplate. Given the variable nature of the term 'rubber', a specification for the material to be used, details of the composition, width, thickness, and frictional resistance properties of the material proposed should all be provided.

   The additional provision of samples may be helpful.

ii. Barriers placed on grass should have 'pins' installed to the stage side of the barrier adjacent to the barrier upright. Steel 'pins' should be specified to suit the barrier system and ground conditions, however, as a guide, 20mm. dia. steel pins, 900mm long placed at 1.0 m c/c. will provide enhanced resistance to sliding. Pins should be located with due consideration of load paths created, in agreement with the barrier supplier's own engineer. Pins should be located such that they do not create trip hazards.

iii. Where ground conditions are in doubt or are known to be poor it may be necessary to provide pins at closer centres or undertake load tests to determine an alternative suitable specification.

   NB In order to prevent damage to underground services, the Event Organiser and contractor is advised to check for buried services below the area where barriers are proposed to be placed on grass.

References:

{1} The event safety guide; Guide to health, safety and welfare at music and similar events.
HSE London
{2} Temporary demountable structures; Guidance on procurement, design and use
I Struct E. London

If you wish to discuss this guidance or require clarification, please contact the

Licensing Section on 0141-287-6615

Annexe A

Front of Stage Barriers.

Verification of Design, Construction and Use.

Certificate of Conformity.

Event details:

Description……..

Location……

Date(s)……

Statement:

This is to certify that the front of stage barrier(s) has (have) been properly designed and erected and will be adequate to resist the anticipated crowd pressure and the minimum design loading specified in the *Temporary demountable structures Guide*. {2}

Event Organiser: Name…….

Signature…….Date…….

Organisation……

Position/ Designation……..

Address……..
……..
……..

Tel…….

Barrier Provider: Name…….

Signature…….Date…….

Organisation……

Position/ Designation……..

Address……..
……..
……..

Tel…….

{2} Temporary demountable structures; Guidance on procurement, design and use
I Struct E. London

Annexe B

Front of Stage Barrier.

Verification of Design, Construction and Use.

Event details:
Description……..
Location……
Date(s)……

	Inspection checklist	Y	N	N/A
1	Is the barrier location consistent with the agreed site plan?			
2	Is the barrier construction in accordance with the specification?			
3	Are any of the barrier sections damaged?			
4	Are the joints correctly fitted and connected?			
5	Is the barrier sited on compact level bearing surface?			
6	Are all connections tight with no trapping points?			
7	Are all surfaces smooth with no rough edges or protruding parts?			
8	Are all tread steps located and locked?			
9	If rubber matting is used is it correctly installed?			
10	If steel pins are used are they correctly installed?			
11	Are there any trip hazards?			

Comments:

Name……..Organisation……

Signature…… Date…….