

# Guide to Safety at Sports Grounds

## Worked Example B: Cricket

## Worked Example A: Cricket

### Introduction

This Worked Example shows the capacity calculations for a ground designed to host cricket. However the basic principles are the same required for most other sports grounds.

The steps outlined here should be read in conjunction with **Chapter 2** and **Figures 1** and **2** of the *Guide to Safety at Sports Grounds*.

A long established, principal objective of the *Guide* is to provide guidance on the assessment of how many people can be safely accommodated within a sports ground whilst it is hosting an event, sporting or otherwise.

**This assessment is the most important step towards the achievement of reasonable safety.**

It is recognised that capacity calculations can be presented in different formats, for example as spreadsheets. However all the steps identified here must nevertheless be followed.

Further guidance on capacity calculations can be found on the SGSA website in the form of Worked Example A, for a football or rugby ground, and Worked Example C, for a racecourse, together with Annex A on the assessment of the (P) factors and Annex B on the assessment of (S) factors.

Both the *Guide to Safety at Sports Grounds* and this Worked Example are compiled and published by the Sports Grounds Safety Authority, Fleetbank House, 2-6 Salisbury Square, London EC4Y 8JX

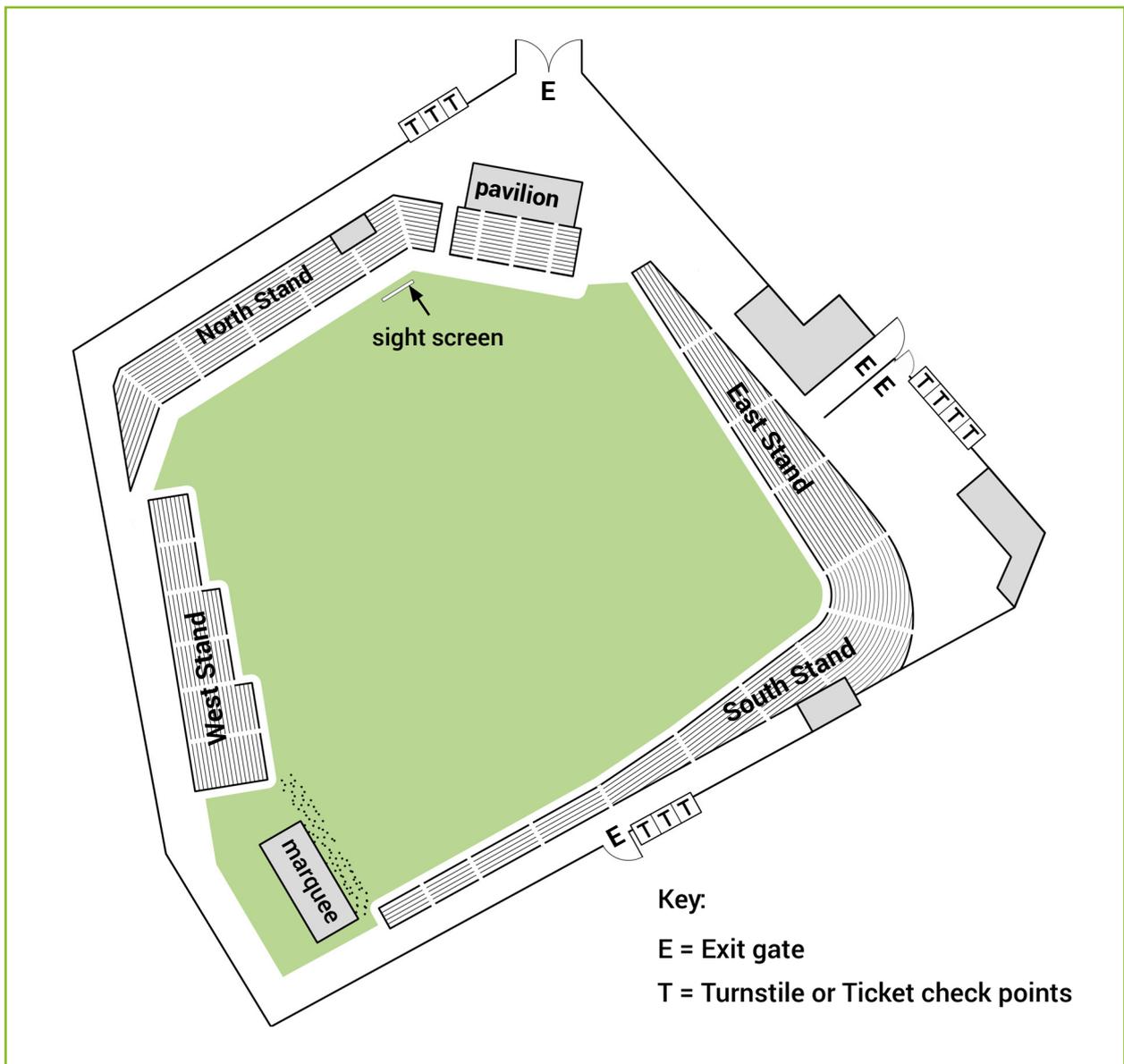
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## WEB.1 Introduction

This example shows a cricket ground offering a combination of reserved and unreserved seating, plus a temporary marquee with a level standing area in front. The circulation system is unrestricted; that is, once entering the ground spectators can circulate freely in all areas.

The calculations that follow are based upon the stages outlined in Chapter Two of the *Guide to Safety at Sports Grounds*. The step numbers cited correspond with the steps set out in **Figure 1** (seated accommodation) and **Figure 2** (standing accommodation).



## WEB.2 Calculate the number of usable seats

This step is explained in Sections 2.6, 12.15 and Step 1 of **Figure 1** of the *Guide*.

As stated in Section 2.6, the number of usable seats does not automatically correspond with the number of seats provided.

	number of seats	restricted views	damaged/ inadequate	sub total
<b>North Stand</b>	2064	100 <sup>1</sup>	0	1964 <sup>3</sup>
<b>Pavilion balcony</b>	72	0	0	72
<b>Pavilion stand</b>	230	0	0	230
<b>West Stand</b>	1506	0	0	1506 <sup>3</sup>
<b>South Stand</b>	1479	0	60 <sup>2</sup>	1419 <sup>3</sup>
<b>East Stand</b>	1109	0	0	1109 <sup>3</sup>
<b>total number of usable seats</b>				<b>6300</b>

**Notes:**

1. Views restricted by sight screen
2. Block of seats withdrawn from sale until replacements provided
3. Seats in these areas are sold as unreserved (see next section)

## WEB.3 Calculate the holding capacity of seated areas

This step is explained in Section 2.6 and Step 2 of **Figure 1** of the *Guide*.

Reserved tickets are sold only for seats in the Pavilion and the Pavilion Stand. Therefore the total number of reserved seats is:  $72 + 230 = 302$

All other seats in the ground are sold as unreserved. As recommended in Section 7.10.d of the *Guide*, a ten per cent reduction should be made to the holding capacity of any seated area where unreserved tickets are sold. Therefore the total number of unreserved seats is:

$$\begin{aligned}
 \text{North Stand: } & 1964 \times 0.9 = & 1767 \\
 \text{West Stand: } & 1506 \times 0.9 = & 1355 \\
 \text{South Stand: } & 1419 \times 0.9 = & 1277 \\
 \text{East Stand: } & 1109 \times 0.9 = & 998 \\
 \\ 
 \text{Total unreserved seats} = & & \mathbf{5397}
 \end{aligned}$$

The management have assessed the (P) and (S) factors for all areas of seating as 1.0. Therefore the holding capacity of the seated accommodation is:

$$302 + 5397 \times 1.0 = \mathbf{5699}$$

## **WEB.4 Calculate the holding capacity of the standing area**

There is one area for standing in the ground, in front of the marquee.

### **a. Step 1 – calculate the available viewing area**

This step is explained in Section 2.8 and **Figure 2** in the *Guide*.

The flat standing area fronting the marquee measures 10m x 2.0m. However, as there is no barrier in front of this area, as stated in Section 2.8.g, a depth of 1.5m should be used for calculation purposes.

Therefore the available viewing area is 10.0m x 1.5m = 15 sq m

### **b. Step 2 – calculate the appropriate density**

This step is explained in Section 2.9 and **Figure 2** in the *Guide*.

The management considers that an appropriate density for the flat standing area is 4.0 spectators per square metre. The management has assessed both the (P) and (S) factors for this area of the ground as 1.0.

Therefore the appropriate density for this area is: 4.0 x 1.0 = **4.0 spectators per square metre**.

### **c. Step 3 – calculate the holding capacity**

This step is explained in Section 2.10 and **Figure 2** in the *Guide*.

The holding capacity of the standing area is: 15 x 4.0 = **60**

## **WEB.5 Calculate the holding capacity of the whole ground**

The holding capacity of the whole ground is:

Seats:	5699
Standing:	60
Total:	<b>5759</b>

## **WEB.6 Calculate the entry capacity of the ground**

This step is explained in Sections 2.11, 7.5 and **Figure 2** in the *Guide*.

As there is free circulation around the ground, the entry capacity for the whole ground, rather than for separate areas of spectator accommodation, can be used as the basis for this step in the capacity calculation. From observation and experience it is apparent that the ground's ten turnstiles and ticket check points can deliver the recommended maximum rate of entry, that is, 660 persons per entry point per hour.

Therefore the entry capacity of the ground is 660 x 10 = **6600**

## WEB.7 Calculate the exit capacity of the ground

This step is explained in Section 10.9 – 10.11 and **Figures 2** and **13** in the *Guide*.

As stated in Section 10.11 of the *Guide*, in order to calculate the exit capacity of a section of viewing accommodation under normal conditions it is necessary to apply a maximum egress time of **eight minutes**. Moreover, for calculation purposes this egress time should be the time it takes for a spectator to proceed from his or her place in the viewing accommodation (known as Zone 2) and reach the *start* of a free flowing exit system. This time is referred to in the *Guide* as the Zone 2 travel time. (As explained in **Figure 13**, under normal conditions there is no need to measure how long it might take spectators to negotiate the *entire* exit route.)

However, in this Worked Example a shared network consisting of front lateral gangways and circulation routes behind and between the stands and the pavilion links all areas of the viewing accommodation to exits on three sides of the ground. Because of this configuration, rather than calculate the exit capacity for each area it is necessary to factor *all* the exits into a single calculation for the whole ground.

There are five exits serving the ground, with the following widths:

North Gate 1:	3.05m
North Gate 2:	3.05m
East Gate 1:	2.80m
East Gate 2:	0.90m
South Gate:	3.10m

total exit width: **12.90m**

All the exit routes are on level surfaces and with few changes of direction. This, combined with observation of crowd flow and spectator behaviour, leads the ground management to apply the maximum rate of passage of *82 people per metre width per minute* for the purposes of calculation. The normal exit time for the ground is *eight minutes*.

Therefore the exit capacity of the ground is:  $12.9 \times 8 \times 82 = \mathbf{8462}$

## WEB.8 Calculate the emergency exit capacity of the ground

This step is explained in Sections 2.13, 10.12–10.18, 15.8–15.12 and **Figures 1** and **13** in the *Guide*.

All exit routes pass through areas that are in the open air and therefore are considered low risk. It is not considered necessary to discount one emergency exit for the purpose of calculation. The condition and the management of the exit routes are both considered to be good. Therefore a maximum emergency exit time of eight minutes – the same as the normal exit time – is considered to be applicable.

However, as stated in Section 2.13 the emergency exit capacity of the ground must include not only spectators but *all people present in the ground*. At this ground there are 20 stewards, four members of the ground staff, eight office staff and ten catering personnel. A further 30 players, team officials and umpires must also be accounted for in the calculation, making 72 non-spectators in total.

Therefore the emergency exit capacity, for spectators only, is  $8462 - 72 = \mathbf{8390}$

## WEB.9 Calculate the final capacity of the ground

This step is explained in Sections 2.11 of the *Guide*.

The final capacity of the ground is lowest figure of those calculated:

holding capacity:	5759
entry capacity:	6600
exit capacity:	8462
emergency exit capacity:	8390

Therefore the final capacity of the ground is: **5759**

## WEB.10 Applying the capacity calculation

This step is explained in Section 2.3 of the *Guide*.

Under no circumstances should more than 5759 spectators be admitted to the ground, unless remedial work and any other necessary steps have been undertaken, and the capacity calculation then re-assessed.

For example, the capacity of the ground could be raised if the 60 seats currently cordoned off in the South Stand are replaced, and if reserved seating was introduced.

## WEB.11 Planning for an exceptional evacuation

This step is explained in Sections 3.15, 3.21 and 10.2.c of the *Guide*.

As required, the management have in place various contingency plans, including for the exceptional evacuation of spectators. Here is one example that the safety management team and the stewards have tested by carrying out exercises.

On a match day, 30 minutes before the close of play, a suspicious bag is spotted behind the pavilion, adjacent to the two North exit gates. Following an initial investigation, the Safety Officer decides to implement one of the management's contingency plans whereby all people present leave the ground, in two stages, via the four exit gates on the south and east sides.

The exit widths of these gates are:

East Gate 1:	2.8m
East Gate 2:	0.9m
South Gate:	3.1m
total	<b>6.8m</b>

Therefore the exit capacity of these gates is  $6.8 \times 82 \times 8 = \mathbf{4,460}$

The holding capacity of the stands nearest to these exit gates is:

West Stand:	1355
South Stand:	1277
East Stand:	998
total	<b>3630</b>

A public address announcement is made to instruct spectators in the West, South and East Stands to exit via the East and South exit gates. Stewards assist by directing the spectators towards these exits (as set out in the training exercise).

A second public address announcement is then made instructing spectators in the Pavilion and Pavilion Stand – that is, those closest to the suspect bag – to exit onto the cricket pitch, again assisted by stewards.

If the West, South and East Stands were at full capacity at the time of this exceptional evacuation, the Safety Officer knows that the total evacuation time should be:

$$\frac{3630}{82 \times 6.8} = \mathbf{6.5 \text{ minutes}}$$

Therefore, after approximately six minutes – by which time the majority of spectators from the West, South and East Stands should have exited – a third public address announcement can be made, instructing the remaining spectators from the Pavilion and the Pavilion Stand, plus all remaining staff, to leave the pitch and move towards the South and East exit gates.