EVENT ECONOMICS

Crowd counting guidelines

These guidelines should be used in conjunction with the 'Crowd calculators' spreadsheet in the Event Economics website.

Why is crowd counting important?

Knowing how many people attend your event is an important input into event planning and management processes, but it also plays a key role in the evaluation process. From an evaluation perspective the most important measure is the event population which is often referred to as the number of 'unique attendees'. Knowing the event population is particularly important when conducting a post-event evaluation because sample-based surveys are scaled up to the event population. If the event population is incorrect then the results of the evaluation will be incorrect.

Ticketed events

It is generally easy to establish the size of a crowd at a ticketed event, particularly if there's a one-to-one relationship between tickets and people e.g. a concert. However, some ticketed events have a many-to-one relationship between tickets and people, which means that one person can buy more than one ticket for their own use e.g. a film festival. When this happens the number of tickets sold will overstate the number of unique attendees, because people who buy multiple tickets for their own use will be counted more than once. This issue can be resolved by estimating the average number of tickets used per person (the measure must be tickets used, not purchased, because it is common for people to purchase tickets on behalf of others). In a pre-event world this will be based on an educated guess, and in a post-event world it should be based on survey results (the respondent should be asked how many tickets they purchased for their own use).

Free events

It is more difficult to establish the size of a crowd at a ticketed event because there's generally no administrative measure like a ticketing database to take guidance from. In such cases a well-designed crowd counting strategy is required. The strategy you adopt will generally depend on the nature of the event, the area in which it is being held, and the duration of the event. For the purposes of this guide it is convenient to define three broad types of events:

- Static linear events – single-session events where attendees stand in the same place along a linear route e.g. Christmas Parade, Pride Parade.
- Static non-linear events – single-session events where the entire crowd is present at the same time e.g. Christmas in the Park, Live Site.
- Dynamic linear events – events where attendees move along a linear route e.g. fan trail, protest march.
- Dynamic non-linear events – multi-session and/or multi day events e.g. Writers Festival, Lantern Festival, Diwali Festival.

The crowd counting strategies of each type of event are discussed below.

Crowd counting strategies

Static linear events

The most accurate and cost-effective method of counting a crowd at a static linear event is video analysis. In the case of a parade, a high definition camera should be mounted to each side of an appropriate float to

capture video footage of the crowds on each side of the parade route. It is then simply a matter of viewing the video footage in slow motion and counting the number of people along the route.

Figure 1 Video footage snapshot of Pride Parade 2018

Static non-linear events

The most accurate and cost-effect method of counting a large static crowd is density analysis. If the crowd has a consistent density then just estimate the size of the event area (usually measured in square metres) and multiply it by the estimated number of people per square metre. For example, if your event area is 50m x 50m then your event area is 2,500 sqm. If the average crowd density is 2 people per sqm then the total crowd size is 2,500 x 2 = 5,000. If the crowd has an inconsistent density then you'll need to divide the event area into sub-areas or "cells" that broadly align with density. You'll need to estimate the crowd size within each cell using the same logic as above, and then add the cell counts together to get the total crowd size.

Figure 2 Division of event area into sub-areas
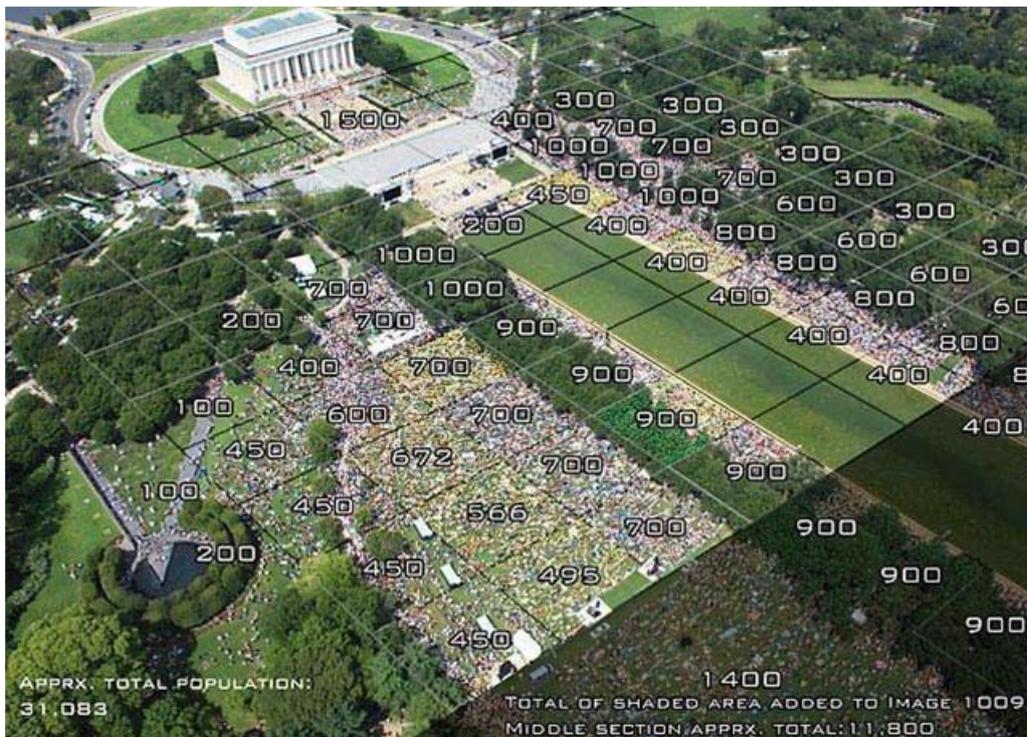
The graphic below provides useful insight into crowd densities. Each grid represents an area of one square metre, so the grid in the upper left has a density of 1 person per sqm. The lower left grid has a density of 4 people per sqm which is near the upper limit of crowd densities and is termed 'mosh-pit density'.

Figure 3 Density of crowds from 1 (top left) to 4 people per square meter (clockwise)
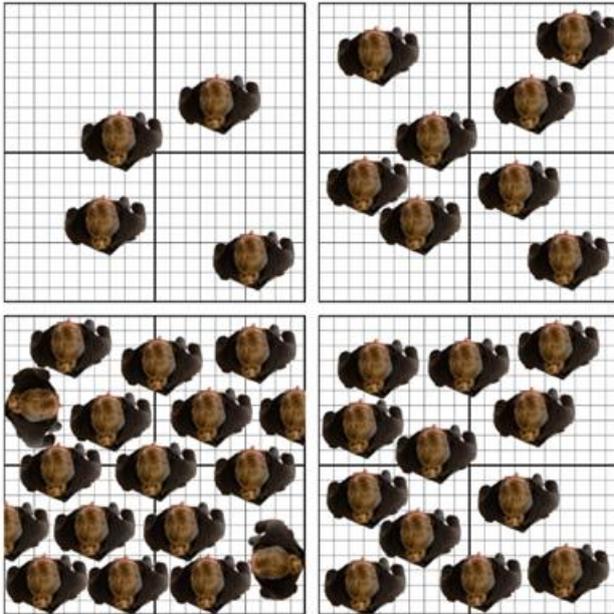
Dynamic linear events

Counting people moving along a route is best conducted from a single vantage point that all attendees will walk past. Narrow points in the route are ideal locations to count because the crowd is less dispersed at these points. Counting options include tally counters, counting apps (essentially electronic tally counters on a mobile device), and video footage which can be analysed after the event (in cases where the flow is too heavy to count in real-time). If tally counters are used, counters should be asked to record their count every half hour or hour so that flow-rates can be analysed. This is not necessary if a counting app is used because each "click" recorded in the app is time stamped.

Dynamic non-linear events

Dynamic non-linear events are the most difficult to count because they often have free-flowing crowds, multiple entry points and can be spread across several sessions and/or days. There are two main problems to overcome with these types of events:

1. Figuring out how to count the number of people entering or exiting the event. Our recommended approach is to:

    -   Conduct a visual inspection of the event area to identify the main entry/exit points. An overhead map may be helpful.
    -   Determine the smallest number of people you will need to cover all the main entry/exit points. If you have limited resources then prioritise the busiest ones and use the results to estimate the rest - this will require some judgement, so visual inspections or partial counts at the other entry/exit points is advised.

- Equip each counter with the training and equipment required to count the number of inward or outward people movements (depending on which direction you deem most appropriate for counting purposes).
- If there is a wide entry point (e.g. the boundary of a park) you'll need to position a counter at one end of the boundary and have them count everyone who crosses the boundary in either an inward or outward direction.
- Counting options include tally counters, counting apps (essentially electronic tally counters on a mobile device), and video footage which can be analysed after the event (in cases where the flow is too heavy to count in real-time).

Following this approach should give you a good estimate of the number of times a person enters or exits the event area during the event. The resulting number is best described as a measure of "gate movements" i.e. the number of times the boundary of the event area is crossed in the chosen direction.

Figure 4 Crowd counting plan for Pasifika 2018

2. Putting measures in place to ensure that each person is counted only once, even if they enter/exit the event on more than one occasion (within the same day and/or across multiple days). This is generally a problem when it is easy for people to come and go from the event (e.g. events held in busy urban areas), and/or when the event is held across multiple days. Our recommended approach to managing these issues is to ask respondents in the post-event survey two questions:

- Which days they attended the event (if it's a multi-day event); and
- How many times the entered/exited the event area on each of the days they attended

The answers to these questions can be used to calculate the average number of times a person entered/exited the event area each day, and the average number of days they attended the event. Unique attendees can then be estimated as:

Unique attendees = Gate movements / average movements per day / average days attended per person.

Happy counting!