



Press Release

Verifiable Count for July 1st March

There has been widespread debate about the number of people who marched on July 1, 2004. The Social Sciences Research Centre of Faculty of Social Sciences, The University of Hong Kong estimates that 112,000 people marched along Queensway during the march on July 1st. The exact number is highly likely to be within the range of 105,000 and 120,000.

‘Our intention is not to dispute other estimates, but to provide estimates that are both accurate and verifiable.’ Dr John Bacon-Shone, Director of The Social Sciences Research Centre (SSRC) explains.

We mounted a video camera on each side of the pedestrian bridge over Queensway from Lippo Centre and filmed all marchers, from the first to pass underneath shortly after 3:30 pm to the last shortly before 7:30 pm. To ensure that we did not invade people’s privacy, we filmed their backs, not their faces.

We examined 4 seconds of video from every 30 seconds of the video, slowing down the frames by a factor of 10 to allow easy counting of the marchers. That provided us with 120 samples from each hour of the march for each side of the bridge, averaging about 32 people per sample for the two sides combined (the maximum was 66 people) for an average flow rate of about 8 people per second, which is about 500 per minute or about 30,000 per hour.

Each sample was counted at least twice and a sub sample was counted four times to ensure high reliability of the counting process. We can make those samples available to anyone interested in examining our work and methodology.

This was entirely an independent project of the Social Sciences Research Centre. Enclosed please find the details of methodology and verification of this scientific calculation.

Should you have any inquiries, please contact Dr John Bacon-Shone at 2859 2412 of the SSRC of Faculty of Social Sciences, The University of Hong Kong.

July 13, 2004



Methodological details

Video cameras were used to tape the entire stream of marchers passing on each side of the road under the High Court Bridge. The filming was done with the flow (i.e. capturing the backs of marchers) to minimize the capture of faces and identity and hence to minimize privacy invasion. Samples were then drawn scientifically from the entire set of video tapes.

Pairs of trained counters (previously tested to ensure accurate and reliable counts) then made independent counts of the number of people who passed under the bridge during each sample. The counts were compared to ensure that there were no major errors. For any sample with inter counter differences of more than 2, the counts were repeated until the results were consistent. In simple terms, the sampling is a 1 in 7.5 systematic sample, so the estimated total flow is eighteen times the total count from all the samples.

The key advantage over simple headcounts is that the counting uses video on a computer that can be slowed down, watched repeated times and counted by multiple counters for accurate and reliable counts. Corrections were made to account for the total of 120 seconds of marchers missed during the three tape changes.

The Bridge provides a fixed reference point across multiple frames of the video, allowing accurate estimation of the flow of marchers past that reference point.

The counting point of the bridge near Lippo Centre was chosen on the belief that all marchers should have joined by this point and few marchers should have dropped out by this point unless they had physical problems, as it is before Central and the split in the route. However, counting at any single location cannot guarantee to count all marchers as people were free to join and leave as they wished. Hence some of the discrepancies between counts will be due to counting at different points in the route.



Verification

The video samples used by the SSRC are available for independent verification and checking. It is also possible to draw new video samples for further checking.

The taping used two Panasonic GS-120 video cameras. Sampling of the digital video used Applescript and BTV Pro video software to capture the video samples to two Apple G4 Power Macintosh computers. The counts were saved in a Microsoft Excel spreadsheet which was used as input to JMP statistical software which was used for statistical analysis.

Sampling was done using 4 second samples of video taken every 30 seconds, separately for each half of the road, i.e. a 1 in 7.5 sample. One hour tapes were used that were changed every hour, for a total of four tapes for each side of the road, yielding a total of 465 samples for each side of the road. The samples covered the entire period of the march, from before the first marchers reached the sampling point until after the march completely stopped other than the total of 120 seconds missed during tape changes. The missing seconds were accounted for by extrapolation from the counts on either side of the tape change.

The estimated standard error was based on the sample variation to account for the sampling error and an additional component to account for counting errors, using counting checks on a subsample.

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