

Rail passenger numbers and crowding statistics: 2011

Statistical Release

5 July 2012

Rail passenger numbers and crowding on weekdays in major cities in England and Wales: 2011

The rail passenger numbers and crowding statistics show rail passenger numbers on trains throughout the day in several major cities, as well as the levels of peak crowding.

The statistics in this report are based on passenger counts carried out by franchised train operators of the numbers of passengers using their services in autumn 2011. They represent passenger numbers on a 'typical weekday'. They cover national rail services only.

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The key findings from the 2011 report include:

- On a typical weekday in autumn 2011, 532 thousand passengers arrived into central London by rail during the morning peak. This compared to 443 thousand passengers departing central London during the afternoon peak.
- Outside London, Birmingham had the highest number of passengers travelling during the peaks, with 36 thousand arrivals in the morning peak and 40 thousand departures in the afternoon peak.
- Overall crowding across both peaks, as measured by the percentage of passengers in excess of capacity (PiXC), was 3.2 per cent in 2011 on London & South East rail services. This was an increase from 3.0 per cent in 2010. Crowding in the morning peak stayed level at 4.0 per cent of passengers in excess of capacity, but afternoon peak PiXC increased from 1.9 per cent in 2010 to 2.2 per cent in 2011.
- First Great Western had the highest level of PiXC of any London & South East operator with 9.9 per cent across both peaks, although this was a fall from 16.6 per cent in 2010.
- Birmingham had the highest crowding outside London in the morning peak in 2011 with 3.1 per cent of passengers in excess of capacity. Manchester had the highest crowding in the afternoon peak with 2.5 per cent of passengers in excess of capacity.

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1. Passenger numbers on weekdays

This section shows how total passenger numbers (first and standard class) on trains on arrival into and departure from city centres compared between cities and across the day on a typical weekday in autumn 2011. It also shows the total numbers of seats provided by train operators. Note that as these statistics are based on counts of the numbers of passengers on board trains they do not necessarily represent the numbers of passengers alighting or boarding at each city, as passengers on services that are passing through a city will be included in the statistics as well.

- On a typical autumn weekday in 2011, 532 thousand passengers arrived into central London (Zone 1 of the TfL travelcard area) during the morning peak (07:00 to 09:59). This was a 2.2 per cent increase from 2010. Four hundred and forty three thousand passengers departed central London during the afternoon peak (16:00 to 18:59), a 0.7 per cent increase from 2010.
- Birmingham had the highest number of passengers travelling during the peaks outside London, with 36 thousand arrivals in the morning peak and 40 thousand departures in the afternoon peak. Manchester, Leeds and Liverpool all also had more than 20 thousand passengers in both the morning and afternoon peaks.
- London had a higher number of passengers on trains arriving into the city centre in the morning peak than departing in the afternoon peak. As Chart 1 shows, the reverse pattern is seen in all other cities, with a higher number of passengers in the afternoon peak. This difference reflects the travel patterns seen in different cities. London had a high number of departures in the hour following the afternoon peak while arrivals were more concentrated into the morning peak. Other cities had more long-distance trains passing through the cities in the afternoon peak than in the morning, which in part explains the higher numbers then.

Chart 1: City centre peak arrivals and departures by rail, excluding London: 2011
(Rail web table RAI0201)

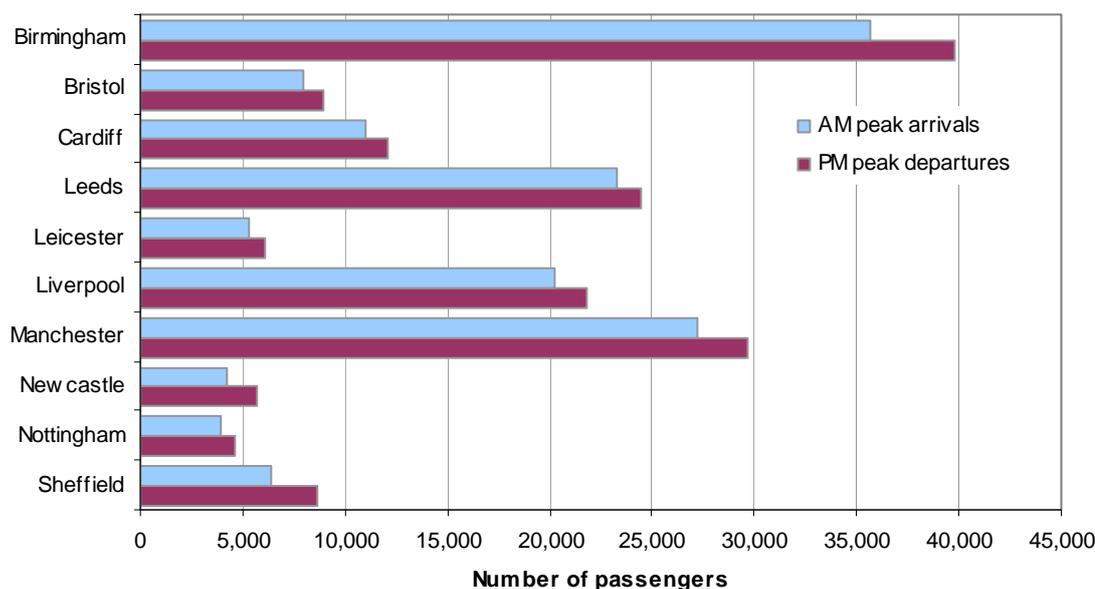
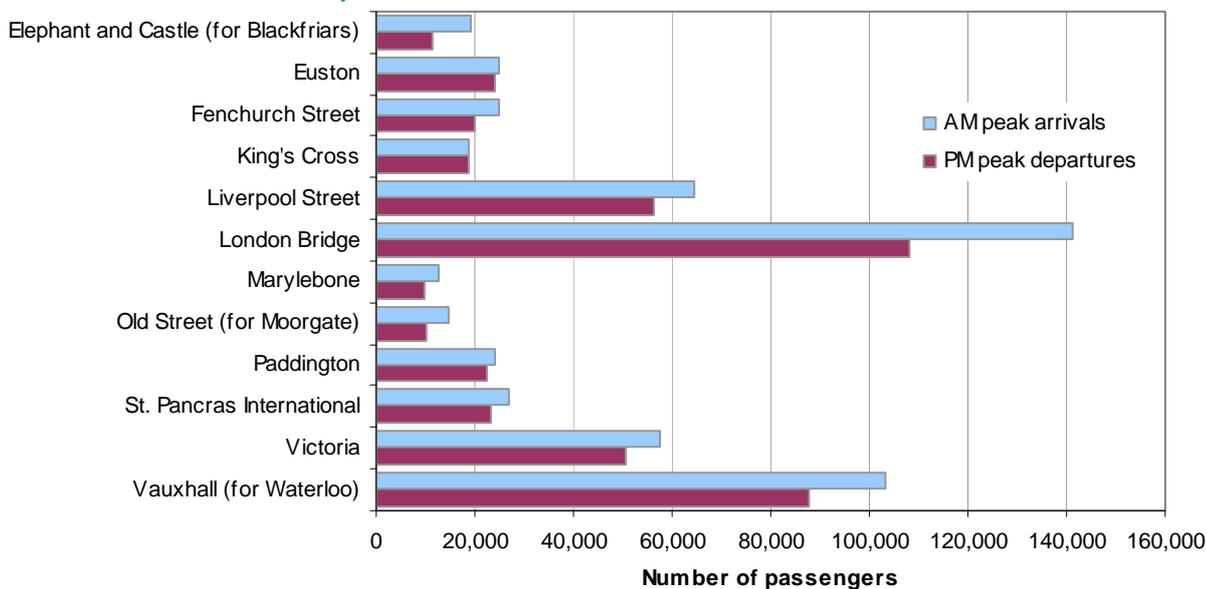


Chart 2 shows how the number of passengers arriving and departing from London in the peaks varied by route on a typical weekday in autumn in 2011. The stations listed are the station on or closest to the Zone 1 boundary on each route.

- One hundred and forty one thousand passengers were on trains entering Zone 1 at London Bridge in the morning peak, 27 per cent of all peak arrivals in London. This total includes passengers who travelled through London Bridge to other stations, such as Charing Cross and Cannon Street. Twenty four per cent of afternoon peak departures were on this route.
- One hundred and three thousand passengers were on trains entering Zone 1 at Vauxhall in the morning peak, 19 per cent of all peak arrivals in London. This includes passengers travelling to Waterloo, including those on trains that did not stop at Vauxhall. Twenty per cent of afternoon peak departures were on this route.

Chart 2: Peak arrivals and departures by rail, by station: London Zone 1: 2011
(Rail web table RAI0201)



Charts 3 and 4 show how the number of passengers arriving into and departing from central London varied throughout the day, and how this compared to the total seats provided by train operators. Passenger numbers in the morning peak are most concentrated in the hour from 08:00 to 08:59, with 268 thousand passengers arriving into central London in this time, half of the morning peak total and over a quarter of all arrivals across the day. The afternoon peak is more spread out, and a similar number of people depart from London in the first hour after the peak (19:00 to 19:59) as in the first hour of the peak (16:00 to 16:59).

More passengers arrived into central London by rail in the hour from 08:00 to 08:59 than the number of seats provided, the only time this happens across a whole hour either on arrival or departure from London. However, as this is an aggregate figure this pattern will vary between routes.

**Charts 3 & 4: Arrivals and departures by rail, by time band: London Zone 1: 2011
(Rail web table RAI0203)**

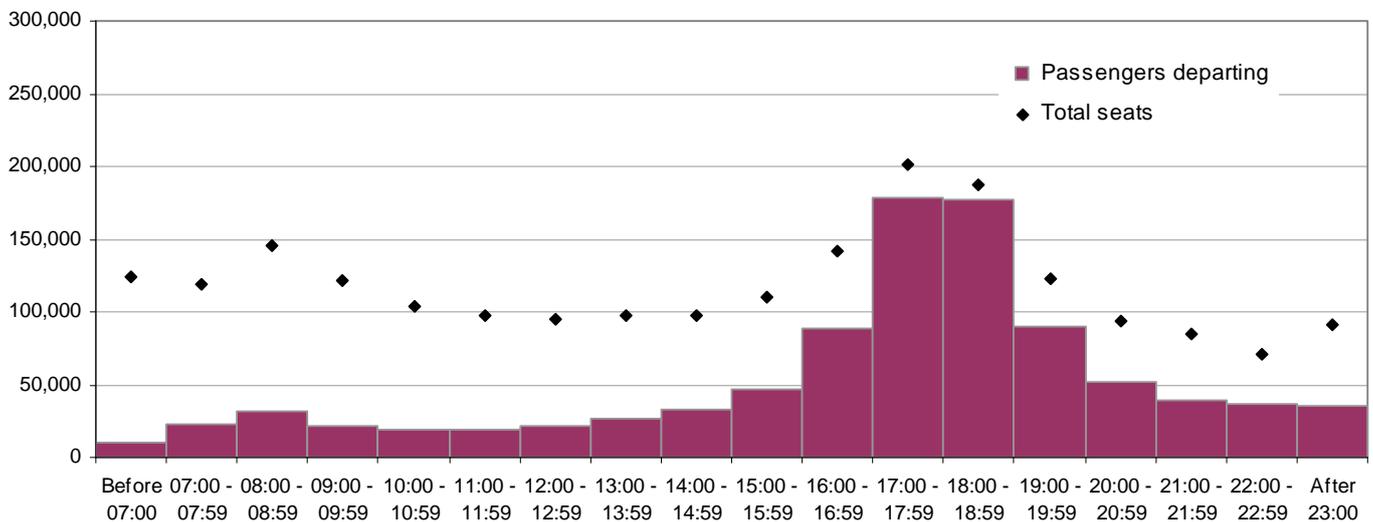
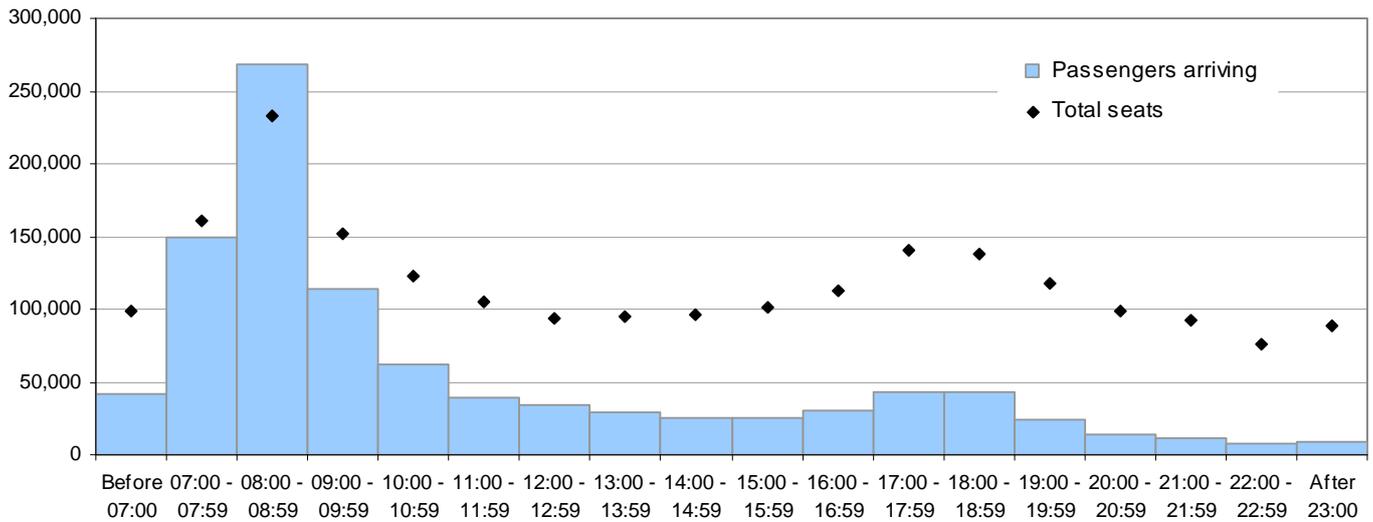
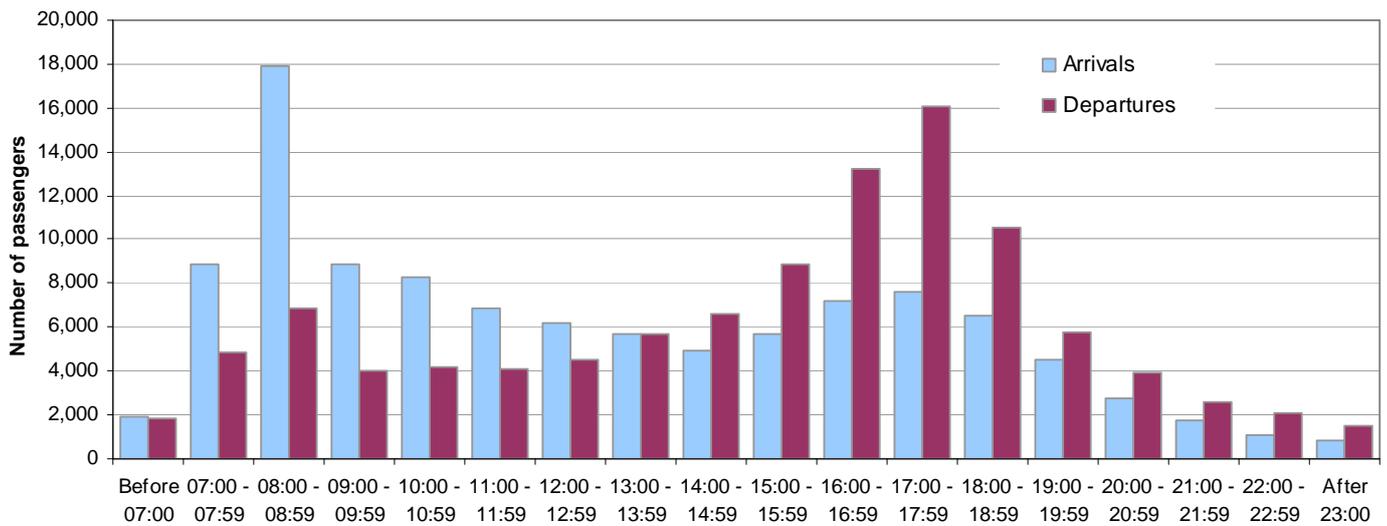


Chart 5 shows how the number of passengers on trains arriving at and departing from the centre of Birmingham varied throughout the day. As in London, arrivals were concentrated in the morning peak (33 per cent of all arrivals) and departures in the afternoon peak (37 per cent of all departures), although these figures were not as high as those for London (55 per cent and 47 per cent respectively). Rail travel in London was more concentrated in the peaks than at other cities, with the highest concentration in the peaks outside London being at Leeds, where 36 per cent of arrivals were in the morning peak and 38 per cent of departures in the afternoon peak.

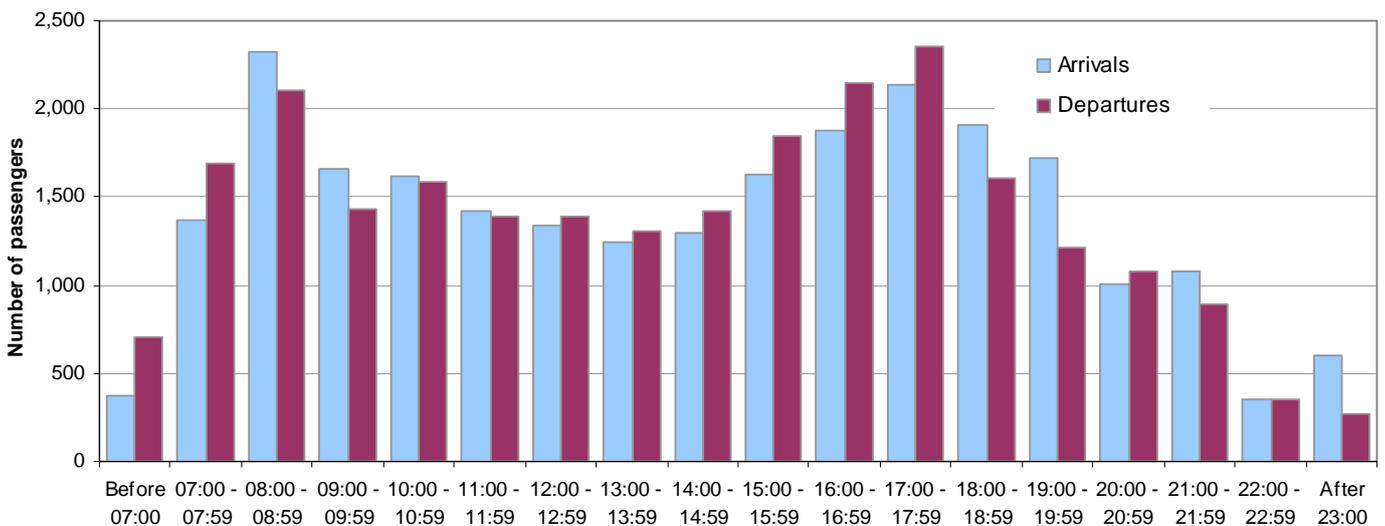
In all cities there was a similar pattern in the morning peak, with around half of all peak arrivals being in the hour from 08:00 to 08:59. In the afternoon however, while departures in London were highest in the last two hours of the peak, in all other cities more passengers were on trains departing in each of the first two hours of the peak than in the last hour.

Chart 5: City centre arrivals and departures by rail, by time band: Birmingham: 2011
(Rail web table RAI0202)



Not all cities followed the same pattern as London and Birmingham in having the number of passengers on trains arriving into the city being highest in the morning peak and the number on trains departing being highest in the afternoon peak. Leicester is notable for having had a higher number of passengers arriving into the city during the afternoon peak than in the morning peak, and this number is similar to the number of departures in the afternoon peak. As chart 6 shows, throughout the day the numbers of arrivals and departures in each hour were similar, and this reflects that there are a large number of long-distance trains passing through Leicester, so a number of passengers on these trains will have been passing through the city and will not actually have boarded or alighted there. A similar pattern would be seen in other cities where a high proportion of services are long-distance travelling through the city.

Chart 6: City centre arrivals and departures by rail, by time band: Leicester: 2011
(Rail web table RAI0202)



2. Peak crowding on weekdays

This section of the statistics shows crowding on peak trains in major cities on a typical weekday in autumn 2011. The morning (AM) peak includes services arriving into a city centre between 07:00 and 09:59, and the afternoon (PM) peak includes services departing from a city centre between 16:00 and 18:59. The one hour high peaks are 08:00 to 08:59 in the AM peak and 17:00 to 17:59 in the PM peak. The crowding statistics cover standard class only, and are based on the number of standard class passengers on board trains at their 'critical load point', that is the point on arrival at (AM) or departure from (PM) a city where the passenger load is highest.

Key definition: Passengers in excess of capacity (PiXC)

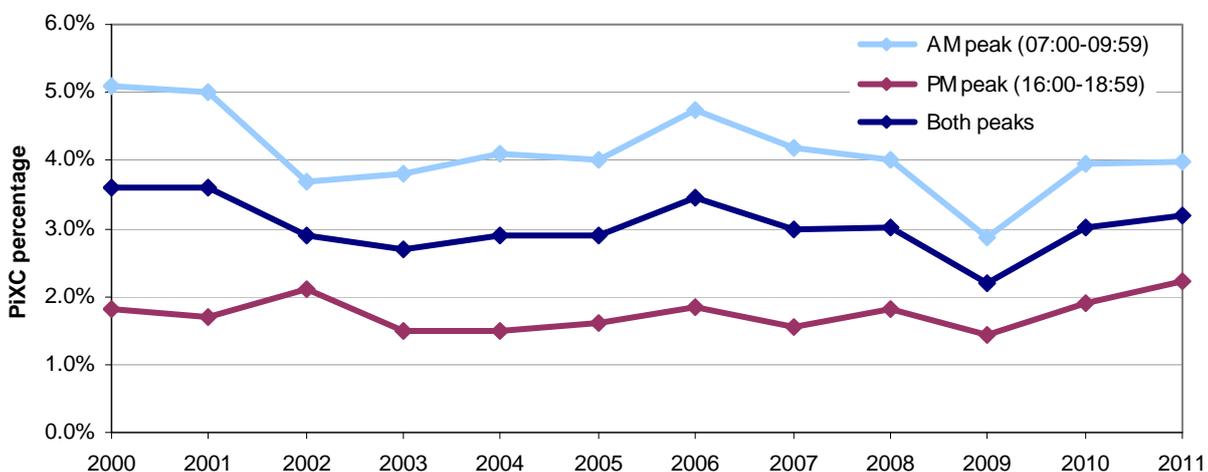
The number of standard class passengers on a service that are in excess of the standard class capacity. It is the difference between the standard class passenger load at the critical load point and the standard class capacity, or zero if the passenger load is within the capacity. Capacities include the number of standard class seats, and include a standing allowance if the time between stations at the critical load point is 20 minutes or less. For each train operator the numbers of passengers in excess of capacity on each service are aggregated together and expressed as a percentage of the total standard class critical load.

The basis for the standing allowances made in standard class capacities can vary between train operators, meaning that differences in PiXC can in some cases be due to differences in standing allowances. For further information and an example of how PiXC is calculated see the [notes and definitions](#).

On a typical weekday in autumn 2011, across both peaks 3.2 per cent of passengers were in excess of capacity (PiXC) on London & South East rail services. This was an increase from 3.0 per cent in 2010. In the morning peak, crowding stayed level at 4.0 per cent PiXC, but in the afternoon peak it increased from 1.9 per cent in 2010 to 2.2 per cent in 2011.

Chart 7 shows how PiXC on London & South East rail services has changed over time. Overall PiXC for both peaks has fluctuated at around 3 per cent for the last ten years, apart from 2009 when it dropped to 2.2 per cent. The recession that ended in late 2009 is likely to have had an impact on this figure, as the number of passengers using London & South East operators' services fell at this time.

Chart 7: Passengers in excess of capacity (PiXC): London & South East operators, 2000-2011 (Rail web table RAI0210)



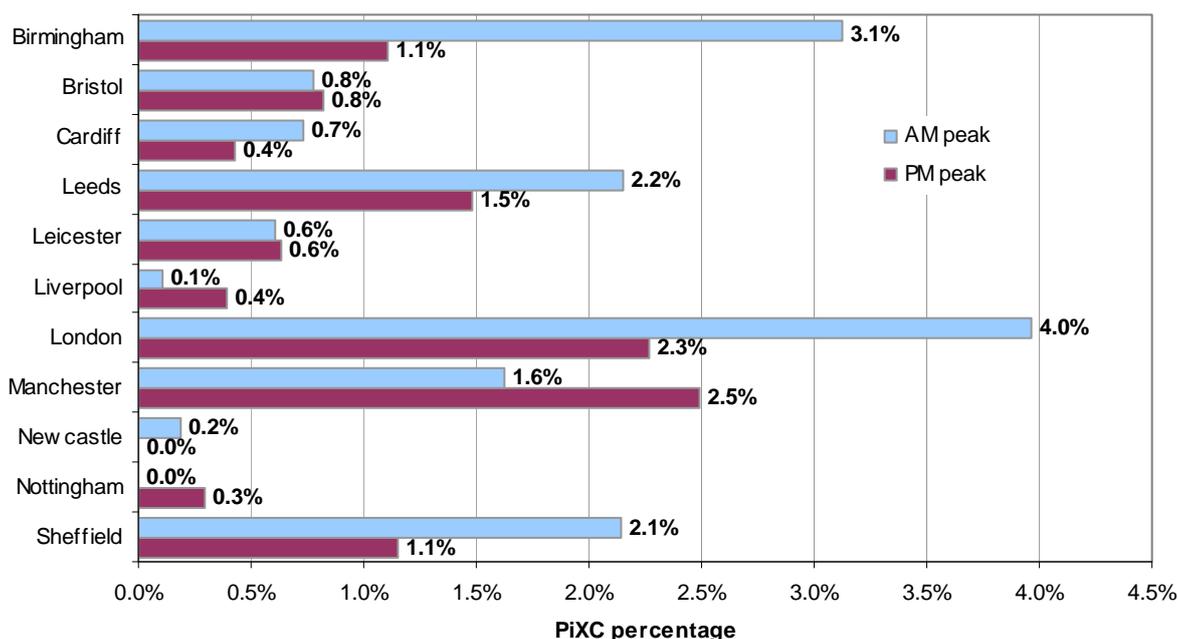
In London, PiXC tends to be higher in the morning peak than the afternoon peak, reflecting the crowding caused by the more concentrated nature of commuter travel in the high peak hour in the morning (08:00 to 08:59) compared to the more spread out nature of departures in the afternoon. In 2011, 5.6 per cent of passengers were in excess of capacity in the morning high peak hour, compared to 2.4 per cent across the rest of the morning peak. In the afternoon high peak hour (17:00 to 17:59) this figure was 2.7 per cent, compared to 1.9 per cent across the rest of the peak.

- First Great Western had the highest level of PiXC of any London & South East operator in 2011 with 9.9 per cent PiXC across both peaks, although this was a fall from 16.6 per cent in 2010.
- PiXC rose to 6.8 per cent across both peaks for London Midland, having fallen to 2.5 per cent in 2010. London Midland unusually had more PiXC in the afternoon than in the morning, with 10.6 per cent PiXC in the afternoon peak in 2011 compared to 2.8 per cent in the morning peak.
- In 2011, PiXC across both peaks rose to 4.0 per cent for National Express East Anglia, to 3.8 per cent for Southern and to 3.3 per cent for Chiltern Railways and South West Trains.
- Overall, 20.3 per cent of passengers were standing at critical load points in London in the morning peak in 2011, and 12.9 per cent in the afternoon peak. These figures are slightly higher than in 2010, when 19.3 per cent were standing in the morning peak and 12.8 per cent in the afternoon peak. On Waterloo services 28.9 per cent of passengers were standing in the morning peak and 22.1 per cent in the afternoon peak, the highest figures for any terminal.
- In the morning peak 23 per cent of the 1,036 services had passengers in excess of their capacity and 61 per cent had passengers standing, compared to 13 per cent of the 1,023 services in the afternoon peak having PiXC and 44 per cent having passengers standing.
- London Overground had the lowest PiXC of any train operator, with no PiXC in either peak for the second year running. This follows the introduction of new high-capacity, metro-style rolling stock on the Watford DC line in 2010. These are designed to carry a high number of standing passengers but have limited numbers of seats compared to most other rolling stock, resulting in London Overground having the highest proportion of passengers standing of any operator with 48 per cent standing in the morning peak and 41 per cent in the afternoon peak.
- PiXC has been calculated for the long-distance operators East Coast, East Midlands Trains and Virgin Trains at London for the first time in 2011. Because they operate long-distance services these operators' services do not usually have standing allowances in their standard class capacities, meaning that their PiXC figures are generally the same as the numbers of passengers standing on their services. East Coast and Virgin Trains both had low levels of PiXC with less than 1 per cent PiXC in both peaks. East Midlands Trains had a high level of PiXC with 11 per cent in the morning peak and 10 per cent in the afternoon peak, despite having a lower percentage of passengers standing than most other operators, with 11 per cent standing in both the morning and afternoon peaks.

PiXC has been calculated for cities outside London for the first time in 2011 to allow crowding to be compared between cities on a consistent basis. The number of passengers standing was calculated for cities outside London in 2010, but was based on passenger counts carried out at the stations in city centres rather than at critical load points, meaning that in some cases the figures will have been lower than if they had been carried out at trains' busiest points. The 2011 figures are based on counts at critical load points, meaning that the 2011 statistics are the first time that PiXC and passengers standing have been calculated on a consistent basis with London for other cities.

- Birmingham had the highest PiXC level outside London in the morning peak in 2011 with 3.1 per cent of passengers in excess of capacity, rising to 5.4 per cent in the 1 hour high peak. In the afternoon peak there was 1.1 per cent PiXC, and 1.0 per cent in the 1 hour high peak.
- Manchester had the highest PiXC level in the afternoon peak with 2.5 per cent of passengers in excess of capacity, rising to 3.7 per cent in the 1 hour high peak. In the morning peak 1.6 per cent of passengers were in excess of capacity, rising to 2.2 per cent in the 1 hour peak. Manchester had the highest proportion of passengers standing outside London in both peaks, with 13.6 per cent standing in the morning peak and 13.2 per cent standing in the afternoon peak.
- In the morning peak Leeds had 2.2 per cent PiXC and 13.5 per cent of passengers standing. In the afternoon peak it had 1.5 per cent PiXC and 11.7 per cent standing.
- Liverpool, Newcastle and Nottingham all had less than 0.5 per cent of passengers in excess of capacity in both the morning and afternoon peaks, and Bristol, Cardiff and Leicester all had less than 1 per cent.

Chart 8: Passengers in excess of capacity (PiXC) by city: 2011
(Rail web table RAI0212)



3. Tables accompanying this release

Nine tables are being published alongside this release, three showing passenger number statistics and six showing crowding statistics. The tables are listed below, and can be found at the following link: <https://www.gov.uk/government/statistical-data-sets/rai02-capacity-and-overcrowding>

Passenger number statistics tables

RAI0201 - City centre peak and all day arrivals and departures by rail on a typical autumn weekday, by city: 2011

RAI0202 - City centre arrivals and departures by rail on a typical autumn weekday, by city and time band: 2011

RAI0203 - Central London arrivals and departures by rail in on a typical autumn weekday, by station and time band: 2011

Crowding statistics tables

RAI0210 - Passengers in excess of capacity (PiXC) on a typical autumn weekday on London & South East train operators' services: annual from 1990

RAI0211 - Passengers in excess of capacity (PiXC) on a typical autumn weekday by operator: London & South East train operators: annual from 2008

RAI0212 - Peak rail capacity, standard class critical loads and crowding on a typical autumn weekday by city: 2011

RAI0213 - Peak rail capacity, standard class critical loads and crowding on a typical autumn weekday in London by terminal: 2011

RAI0214 - Peak crowding on a typical autumn weekday by city and train operator: 2011

RAI0215 - Peak crowding on a typical autumn weekday in London by terminal and train operator: 2011

4. Request for feedback

We are keen to hear how these statistics are used and would welcome your views on this new release. It would be greatly appreciated if you could complete this [short survey](#).

5. Revisions

This release was revised in December 2012 following corrections to the numbers of seats and standard class capacities used for a small number of First Great Western services at London Paddington in the calculation of the published statistics for 2011. This has resulted in some revisions to First Great Western figures at London Paddington, and figures for London overall. For further details of these revisions please see the correction note on the [publication release page](#).

In July 2012 several revisions were made to the 2010 statistics that were first published in August 2011, in most cases as a result of amended data being received from train operators. In most cases they had a small overall impact on the statistics.

- For St Pancras the AM peak standard class capacity total was been revised upwards, and the London total was changed accordingly. No other figures were affected.
- For Cardiff the number of services in the AM peak was revised from 111 to 113, and the number in the PM peak from 113 to 114. Most other figures had small revisions reflecting the increases in services included, most notably the percentage of passengers standing in the PM peak being revised upwards from 1.6 per cent to 2.0 per cent.
- For Manchester the number of services in the PM peak was revised down from 184 to 182, also resulting in the number of standard class seats being reduced. The number of standard class seats was also revised for several services in both peaks, having no other impact on the AM peak but resulting in the percentage of passengers standing in the PM peak being revised down from 11.2 per cent to 10.9 per cent.
- For Leeds the number of standard class seats was revised for several services in both peaks, resulting in increases in the numbers of standard class seats and reducing the percentage of passengers standing from 14.0 per cent to 12.8 per cent in the AM peak, and from 12.1 per cent to 11.5 per cent in the PM peak.

6. Background notes

1. Further information about the statistics in this report can be found in the [Notes and definitions](#).
2. Due to problems with automatic counting equipment it was necessary to use counts from outside the autumn 2011 period or estimates for a large number of First Capital Connect services in London and Northern Rail services in Newcastle in the 2011 statistics. Therefore these figures should be treated with some caution.
3. To retain data confidentiality two c2c services at London Liverpool Street and two Chiltern Railways services at London Paddington were excluded from the 2011 passenger number statistics. See the [Notes and definitions](#) for details of the confidentiality of passenger count data.
4. These official statistics are not designated National Statistics. However, they are produced to high professional standards set out in the [Code of Practice for Official Statistics](#). They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.
5. Details of Ministers and officials who receive pre-release access to these statistics up to 24 hours before release can be found in the [Pre-release access list](#).
6. For annual rail usage statistics please see the [Office of Rail Regulation](#) website.
7. This is an annual publication. The next release of rail passenger numbers and crowding statistics will be the 2012 statistics published in July 2013.