

OCCUPIER DENSITY STUDY 2013

SEPTEMBER 2013



ABOUT THE BCO

The British Council for Offices' (BCO) mission is to research, develop and communicate best practice in all aspects of the office sector. It delivers this by providing a forum for the discussion and debate of relevant issues.

ABOUT THE AUTHORS

The research team for this project included Michael Bedford, Rob Harris and Annetta King from Ramidus Consulting Limited, and Andrew Hawkeswood of IPD. We would like to acknowledge and express our deep gratitude for the contributions made to our research by a large number of people. Their invaluable help with time and data have contributed to creating a very robust report and set of findings.

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EXECUTIVE SUMMARY

This study was commissioned by the BCO, in January 2013. The key objective was to gather and analyse a representative sample of occupation density data with which to inform the forthcoming *2014 Guide to Office Specification*.

A key aspect of the *BCO Guide to Specification* is the set of guidelines on design features such as means of escape, sanitation, lifts and air handling. Robust

guidance in these areas is dependent on strong evidence of occupation densities. Such evidence is also critical for occupiers planning accommodation to meet their operational requirements.

The main data set comprised 2,485,484m² (26,753,753ft²) of office space, spread across 381 properties and 1331 individual floors.

HEADLINE RESULTS

The overall finding is a mean density of one workplace per 10.9m² net internal area (NIA). Of the sample properties 38% fall within the range 8–10m², while 58% fall within the wider range of 8–12m².

A breakdown by sector (Table 1) shows that the lowest and highest densities are in the Corporate (13.1m²) and Financial & Insurance (9.7m²) sectors, respectively. The high densities in the Financial & Insurance sector are often pushed up by particularly high densities in parts of buildings. The regional breakdown (Table 1) shows that the south and west region has the highest density, at 8.6m². London and the south east have lower densities than all but one of the other regions, a result partly

explained by the fact that London buildings typically have a greater proportion of their space allocated to lower density uses such as client entertainment and meeting space.

As well as the main data exercise, we undertook an analysis of data held by IPD, from 2008 to 2012, including whole building, sector and location, and in time series. We examined 4.37 million m² (47 million ft²) in 823 properties from the private sector data set and 4.08 million m² (44 million ft²) from the central government dataset. We calibrated the IPD data to correspond with the sector breakdown from the main study to allow direct comparison and validation between the two data sets.

Table 1 Breakdown of results by sector and region.

SECTOR	DENSITY (m ² NIA)	REGION	DENSITY (m ² NIA)
Corporate	13.1	South east	12.7
Financial & Insurance	9.7	Wales	11.4
Professional Services	12.3	London	11.3
Public Sector	12.1	Midlands	10.2
Technology, Media & Telecommunications (TMT)	10.5	North	10.1
		Scotland	9.7
		East	9.4
		South and west	8.6

DENSITY INCREASES SLOWING?

Evidence presented here (see *Density Over Time*, p. 25), and a host of anecdotal evidence, suggests that densities have risen over recent years as economic pressure and technology enablement have combined to encourage changes in workstyles. However, it is to be expected that this increase in densities should level out at some point – densities can only increase so far. Our data suggest that this might be happening now and, if true, this has important implications for guidance on specification. Such a trend suggests a reducing need to increase building specification to future-proof against higher densities.

Despite the evidence that density averages might be levelling out, it was reported during our stakeholder interviews that there is a perception among some advisors that density levels are continuing to rise.

There is little doubt that, in a diverse market (see below), there will be instances where this is true. There might even appear to be a pattern of instances. But caution needs to be exercised in extrapolating from the particular to the general. There are implications attached to allowing the specific and perceived needs of a small (albeit important) segment of the demand market to determine the supply response across the whole market. A further enhancement in design standards would be a significant step, not least due to the implications for construction costs, net-to-gross ratios and environmental considerations.

It is imperative, therefore, that the perception of change is borne out by reality and is demonstrable across a broad cross-section of the occupier market in different locations.

MARKET DIVERSITY

One of the key issues here is the extent to which a potential shift in design guidance might be driven by the specific needs of a small sector of demand. This subset of demand is typified by large occupiers of (often) central London buildings, who have specific demands in terms of trading floors and other high-use areas within buildings. Yet, demand is highly diverse, and in the years since the credit crunch a reduction in leasing activity by the Financial and Professional

services sector has been balanced by a rise in the activity of other sectors, particularly Technology, Media & Telecommunications (TMT).

What this highlights is the diversity of the demand market, and the fact that the occupancy styles of large sections of that market make very different demands on buildings to those in the Financial and Professional services sectors.



THE LESSONS OF EFFECTIVE DENSITY

It is clear from a wide range of empirical work that the densities to which buildings are designed, the densities to which they are then laid out, and the densities at which they are in fact occupied (both peak and mean), are all very different. We are aware, for example, of many organisations that have introduced flexible working styles, in the expectation that utilisation rates would increase substantially, but where occupation levels very rarely exceed 80%.

The implication here is that this study's headline mean density of 10.9m² should be clearly understood as a headline workplace density, not a headline occupation density, due to almost constant levels of underutilisation. Effective density is a more reliable guide to actual occupation density than relying on a simple workstation density.

LOCAL DENSITY AND BUILDING DENSITY

As flexible workstyles continue to spread, typical space budgets within buildings are changing. While at one time, a typical space budget might have comprised 80% fixed workplaces, 15% meeting space and 5% other support space (post rooms, computer rooms etc.), today's typical office is far more dynamic. An office today is likely to have a greater variety of workstation settings, but in a smaller proportion of the overall space budget. The main factor causing the shift is a growth in meeting space – client entertainment, formal meeting rooms, collaborative space and other forms of space to cater for mobile working.

This has the effect of introducing variable densities in buildings. For example, while workplaces on a purely work floor might be planned to a high density (say, 8m²),

other areas of the same building might be allocated to meeting and client entertainment space, reducing workplace densities there significantly (say 18m²). Overall, there might be a mean density of, say, 10m².

The response within the development sector is a tendency to cater for the highest densities across the whole space: providing for the worst-case scenario, everywhere, from day one. The question is whether we should be more accepting of buildings responding to changing occupier needs over time, by enabling them to adapt to specific increased demands on building services. Most, if not all, buildings should have the potential to increase densities locally. Support floors with few workplaces are not necessarily low density, and therefore also require the potential for enhancement.

UNINTENDED CONSEQUENCES

If the market continues to enhance the specification of buildings in the belief that more intensive use will continue to increase demands on their services, then costs will be added to construction, usable floorspace will be lost, and there will be environmental consequences.

Of course, occupiers require flexibility, to be able to change layouts and use profiles as business changes dictate. It might be argued that a higher specification building can be 'turned down' in performance terms if it is not occupied to the optimum level, and that this will

extend the life of the plant etc. But is this what happens in practice? Will occupiers really adjust systems to suit differing densities over time?

Does the optimum flexibility afforded by high specification, and required by a relatively small segment of the demand market, justify its blanket provision? There is no evidence that we are aware of which suggests that any buildings constructed in the past, say, 15 years have been unable to cope with higher densities due to their design standard of 1:10 (or even 1:12).

A CHANGE TO GUIDANCE?

While showing an increase in densities from the previous survey in 2009, the findings of this study remain broadly in line with current BCO guidance on densities. However, the study has emphasised the

need to design for diversity, allowing densities to be raised locally in all buildings (not just those for users, such as banks, with trading functions).

DISCLAIMER

We would like to stress at this point that the views expressed in this report are entirely those of the principal authors, and should not be taken in any

way to reflect the views of any of those individuals or organisations acknowledged here.

INTRODUCTION

BRIEF AND OBJECTIVES

The context for this study is the *BCO Guide to Office Specification*. Last published in 2009, this document provides guidance for best practice in all aspects of office design. The *Guide* has become the accepted industry standard, providing authoritative guidance to developers, occupiers and property professionals.

A fundamental aspect of the *Guide* is occupation density, because it determines critical design features such as means of escape, sanitation, lifts and air handling. In order to be able to provide robust guidance in these areas, it is necessary to have good evidence

of occupation densities. Such evidence is also critical for occupiers in selecting and planning accommodation so that it meets their specific operational requirements. To meet this need, the 2009 *Guide* was underpinned by a major study of occupation densities.¹

The present study was commissioned by the BCO, in January 2013. The key objective was to gather and analyse a representative sample of occupation density data with which to inform a revised BCO guide, due to be published in 2014. In addition, the aim was to compare the 2013 data with the evidence base of the 2009 *Guide*.

APPROACH

Stage 1 – Main data exercise

The main data collection and analysis for this study involved working with the BCO membership. Occupiers contributed data from their own occupied portfolios, while developers, designers and owners contributed data from projects in which they had recently been involved.

The sample size in this phase of the work comprised 2,485,484 m² (26,753,753 ft²), spread across 381 properties and 1331 individual floors.² This sample provides a very robust data set, which was broken down into location, sector, age and size, and analysed. All buildings in the sample contained the net internal area for all floors, the number of workplaces by floor, and density measures for all floors.

Stage 2 – IPD data

In addition to the main data exercise we compared our data set with the IPD database. IPD is a well-known and respected organisation specialising in property

market benchmarking. Data collected by IPD is validated with occupiers to ensure accuracy. The data set is categorised and classified within the internationally recognised Global Estate Management Standards, which cover space, cost and environment.

Our analysis of the IPD data included 4.37 million m² (47 million ft²) in 823 properties from the private sector data set, and 4.08 million m² (44 million ft²) from the central government dataset. One of the critically important aspects of the IPD data set is its annual refresh and validation, which allows for time-series analysis. We therefore analysed the data from 2008 to 2012. We also calibrated the IPD data to correspond with the sectoral breakdown in the main study, to allow direct comparison between the two data sets.

Stage 3 – Perception study

The third workstream comprised a series of discussions with developers and advisors. The purpose here was

1. *Occupier Density Study: Summary Report*, June 2009. A brief summary is included as Appendix 1. While the report was published in 2009, the data were collected in 2008.
2. In the equivalent survey for the 2009 study, the sample comprised 2,005,268 m² (21,584,703 ft²), across 249 properties and 938 individual floors.



to gain a market perspective from those involved in the day-to-day supply of new buildings, and whether they thought that changes to BCO guidance was required. These interviews followed a semi-structured format,

and drew out a number of issues that have helped inform the wider analysis of the data for this study and the conclusions which we have drawn.

OCCUPATION DENSITY

It is estimated that around half of the near 30 million workers in the UK work in offices. Commercial offices continue to be a major building type, representing 29% of all non-domestic stock. At £224 billion, the total value of offices represents 31% of the total value of all UK commercial stock.³

The manner in which offices are occupied is important from two conceptual perspectives: planning and management. Planning (policy, design and delivery) must understand how offices are occupied in order to ensure that the provision of office stock broadly matches demand. Management (occupation) must ensure that the cost of office space is aligned with commercial priorities through efficient occupation of space. At each stage the density measure supports decision-making as a proxy measure of business activity.

At the planning stage the density figure allows planners to understand the economic activity that might be generated through potential employment, and therefore the approximate amount of space that needs to be built. In design, density provides a means



of sizing the core (including lifts, fire egress, stairs and toilets), mechanical and electrical services, and other building and facility management support services (e.g. cleaning, waste management, catering and security). The density figure in occupation provides management with information on occupancy costs, statutory design capacities and the ability to estimate the practical building capacity for business planning.

THE NATURE OF INTENSIFICATION

The twin forces of economics and technology have encouraged occupiers in recent years to assess their occupation of space and seek to make efficiency savings. In terms of economics, public and private sector organisations have been under severe pressure to reduce accommodation costs. Rents and rates, which are driven by demand for space, represent about 60% of occupancy costs, and, if demand for space can be managed downwards, then significant savings can be made.

The second driving force has been the proliferation of information technology, which has enabled mobility, networking and collaboration, and has led to organisational transformations, with growing numbers of organisations introducing flexible working styles.

The economic pressures and technological enablement have transformed the efficiency and effectiveness with which real estate can now be managed. Expensive property is now being used far more intensively than in the past, and new standards for best practice in space management are emerging.

There are two principal means of achieving more intensive use of space. First, space allocations per workplace are reduced, typically through more open plan and fewer enclosed offices, and space being dedicated to circulation and unnecessary ancillary uses.⁴

The second step to intensify the use of space is to manage the work environment more dynamically by introducing

3. Property Industry Alliance (2012) *Property Data Report 2012*.

4. See Technical Notes (Appendix 2) for a description of the role of Building Regulations.

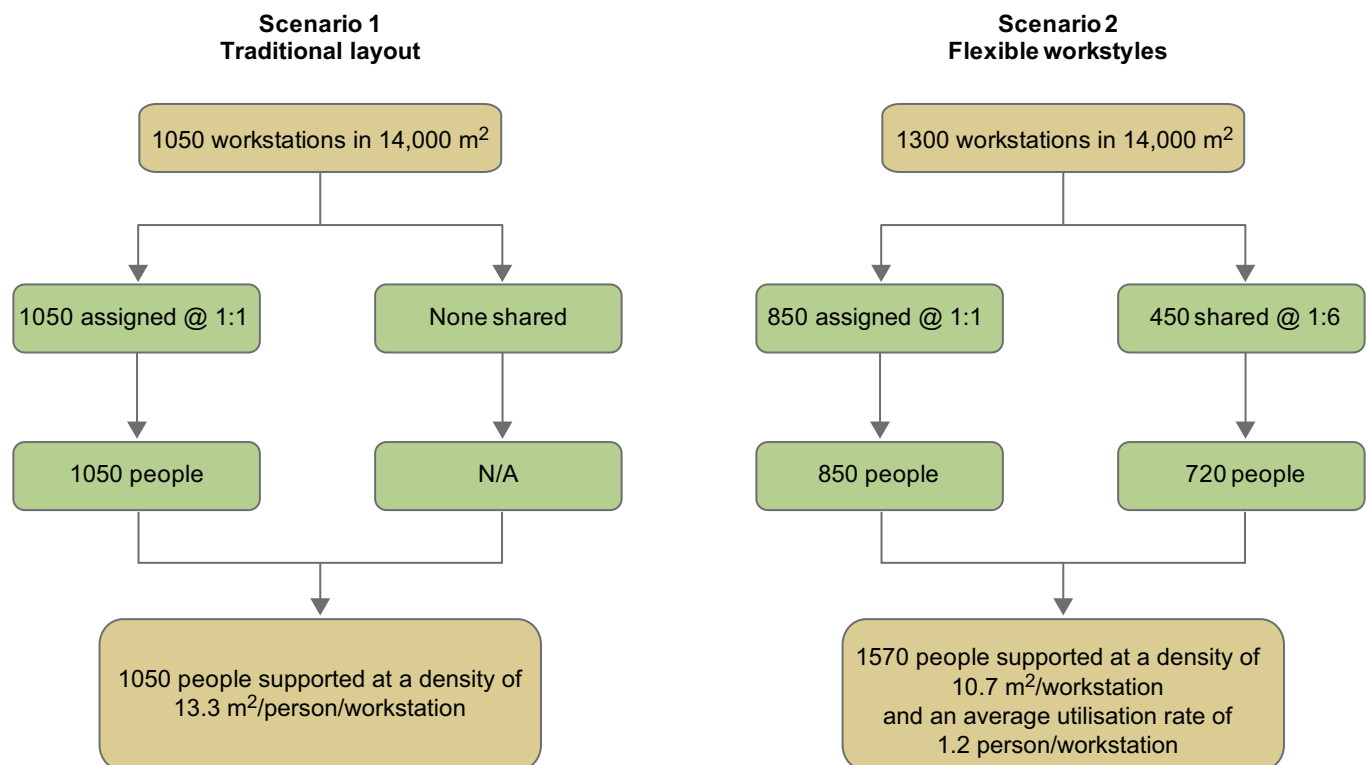


Figure 1 Intensification of space use.

flexible working. It is well known that traditional office layouts are underutilised most of the time due to people being out of the office, and many organisations have introduced flexible working styles and desk sharing as a means of improving their use of space. More dynamic use of space allows a building to support more people in the same amount of space: spaceless growth. The impact can be dramatic, often reducing an organisation's need for space by around 20–30%. Figure 1 provides a simple model of these dynamics.

In terms of workplace optimisation, many organisations are now working towards targets for increased workplace density and higher utilisation.

The picture is further complicated by the introduction of hot desks, drop-in desks and so on. It is thus important

to recognise that space use is not homogenous, and that there has been a shift in the balance between workspace, ancillary space and support space in office buildings. It is necessary to distinguish between the most densely occupied parts of buildings and the overall building density.

The ability to increase occupation density is a key element of flexibility for an occupier. In this sense, higher specification to support higher density is demand driven. However, the higher the specification of building infrastructure, the more expensive the overall product, in terms of both construction and life-cycle costs. A key issue for developers (and the property industry more widely), therefore, is what the appropriate response might be from the supply side.

MEASURING DENSITY

Occupational density is commonly calculated using the net internal area (NIA), and it is usual to calculate density for whole buildings, i.e. to express density as

the total NIA divided by the total number of workplaces in the building. NIA is unambiguous, and is defined in the Royal Institution of Chartered Surveyors (RICS)

Code of Measuring Practice. It is the usable space within a building measured to the internal finish of structural, external or party walls, but excluding toilets, lift and plant rooms, stairs and lift wells, common entrance halls, lobbies and corridors, internal structural walls and car-parking areas.

However, the appropriate population of a building can be more problematic to measure than the area. There are three relevant measures of population:

- The **notional population** defined by the number of workplaces planned in the property. In other words, the maximum population which the interior of the property has been designed to support.
- The **total number of people** for whom the property is their normal base. This might be less than the notional population where the property is underoccupied for any reason. In organisations in which flexible working styles are adopted, the total number of people can be greater than the notional population.
- The number of **workplaces being used** at any one time. Studies regularly show that this number is less than the notional population, consistently running at between 50% and 60% of the notional population.

It is thus possible to take these measures of population to distinguish three types of occupation density:

- **Work place density (square metres per workplace)**
NIA divided by the number of workplaces the property contains or has been designed to support. This is the most useful measure of density for assessing requirements for building infrastructure, or identifying the maximum number of people that a known building can accommodate at any one time.
- **Population density (square metres per worker/FTE)**
NIA divided by the number of people that the property supports. It is not uncommon for the population to be higher than the workplace density, i.e. the property supports more people than the number of workplaces it contains, and functions on the basis of flexible working styles.
- **Effective density** As noted, buildings, or the workplaces and other spaces within them, are rarely, if ever, occupied to maximum capacity. For many organisations the maximum number of workplaces in use is significantly below the number planned.

EFFECTIVE DENSITY

The dynamics of effective density are shown in the model in Figure 2. It is people, not workplaces, that create the demand for building services, stairs and other vertical circulation. Considering workplace density alone can overstate the actual demands placed on building infrastructure. The figures used to illustrate effective density here are hypothetical, although not untypical for many organisations.

Effective density is thus a function of workplace density and utilisation (workplace density divided by

the maximum utilisation of workplaces, expressed as a percentage). At 100% utilisation, workplace density equates to effective density.

The impact of applying utilisation rates is shown in Table 2 (reproduced from the 2009 study). As noted above, effective density is expressed as NIA per person (per occupied workplace), and is a better guide to actual demands on building infrastructure.

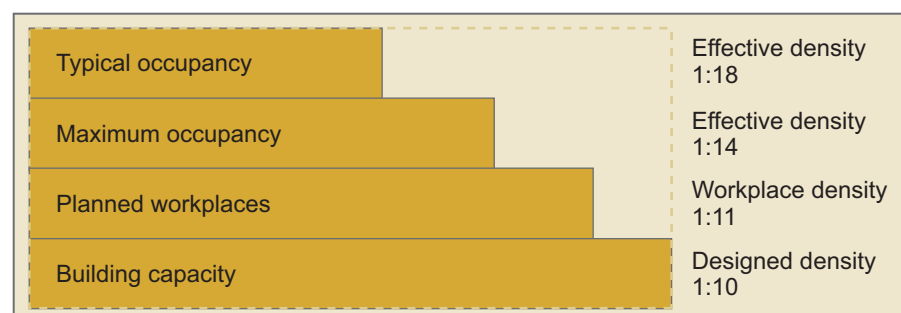


Figure 2 Effective density.

Table 2 *Utilisation and effective density.*

WORKPLACE DENSITY (m ² NIA)	UTILISATION (%)										
	100	95	90	85	80	75	70	65	60	55	50
7	7.0	7.4	7.8	8.2	8.8	9.3	10.0	10.8	11.7	12.7	14.0
8	8.0	8.4	8.9	9.4	10.0	10.7	11.4	12.3	13.3	14.5	16.0
9	9.0	9.5	10.0	10.6	11.3	12.0	12.9	13.8	15.0	16.4	18.0
10	10.0	10.5	11.1	11.8	12.5	13.3	14.3	15.4	16.7	18.2	20.0
11	11.0	11.6	12.2	12.9	13.8	14.7	15.7	16.9	18.3	20.0	22.0
12	12.0	12.6	13.3	14.1	15.0	16.0	17.1	18.5	20.0	21.8	24.0
13	13.0	13.7	14.4	15.3	16.3	17.3	18.6	20.0	21.7	23.6	26.0

DENSITY AND BCO GUIDANCE

The evidence presented in this report is aimed at informing the forthcoming *BCO Guide to Specification*, particularly in areas of specification such as means of escape, sanitation and air handling. At this level, it is concerned with the maximum capacity of a building *at any one point in time*. Because of this focus, we have not addressed flexible working styles (beyond the brief

discussion in this section and in Effective Densities on page 22, where we show the impact of effective densities on our sample), because they do not change the ‘at any one point in time’ discussion. Consequently, occupation density in this report is defined in terms of square metres per workplace, as the key indicator of potential capacity.

DATA ANALYSIS

In this section we present the findings of the main data exercise. As stated in the introduction, the sample size from this phase of work was 2,485,484m² (26,753,753ft²). The sample was spread across 381 properties and

1331 individual floors. Our 2013 sample is larger than the one in the 2009 study, but it has a similar sectoral and spatial spread.

WHOLE BUILDING ANALYSIS

Figure 3 shows the full sample of 381 properties. The overall mean density across the sample is 10.9m²/workplace. The median value is 10.8m²/workplace, demonstrating a good normal distribution. The mean value of 10.9m² compares with 11.8m² in the 2009 study. This represents a significant shift, but one that could be in line with a longer term trend that suggests a possible slowing down of the rate of increase in densities. This question is returned to in Density Over Time on page 25.

At the high density end we have predominantly Insurance and other Financial companies, including

contact-centre-related functions. The lower density end is typified by Corporate headquarters, some legal firms, and occupiers with a high proportion of support space.

Figure 4 shows the whole sample data set again, but by the number of properties in each density band. Of the total sample, 38% of the properties fall within the 8–10m² range, while 58% fall within the wider 8–12m² range.

Figure 4 shows 38 properties at 7m² or less. This partly reflects the presence of contact-centre-type activity within the sample, but it also points to back-office activity and process-oriented environments.

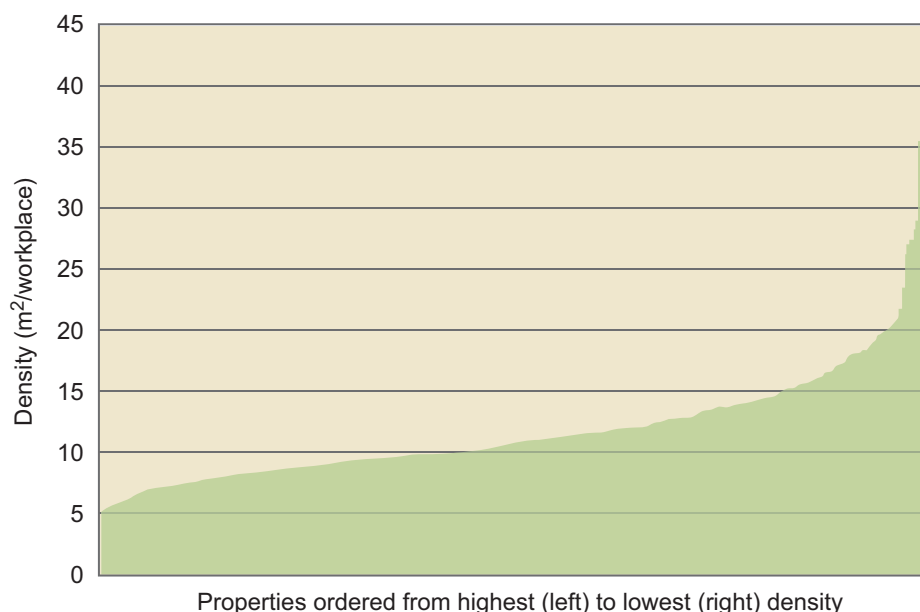


Figure 3 Whole-sample building densities.

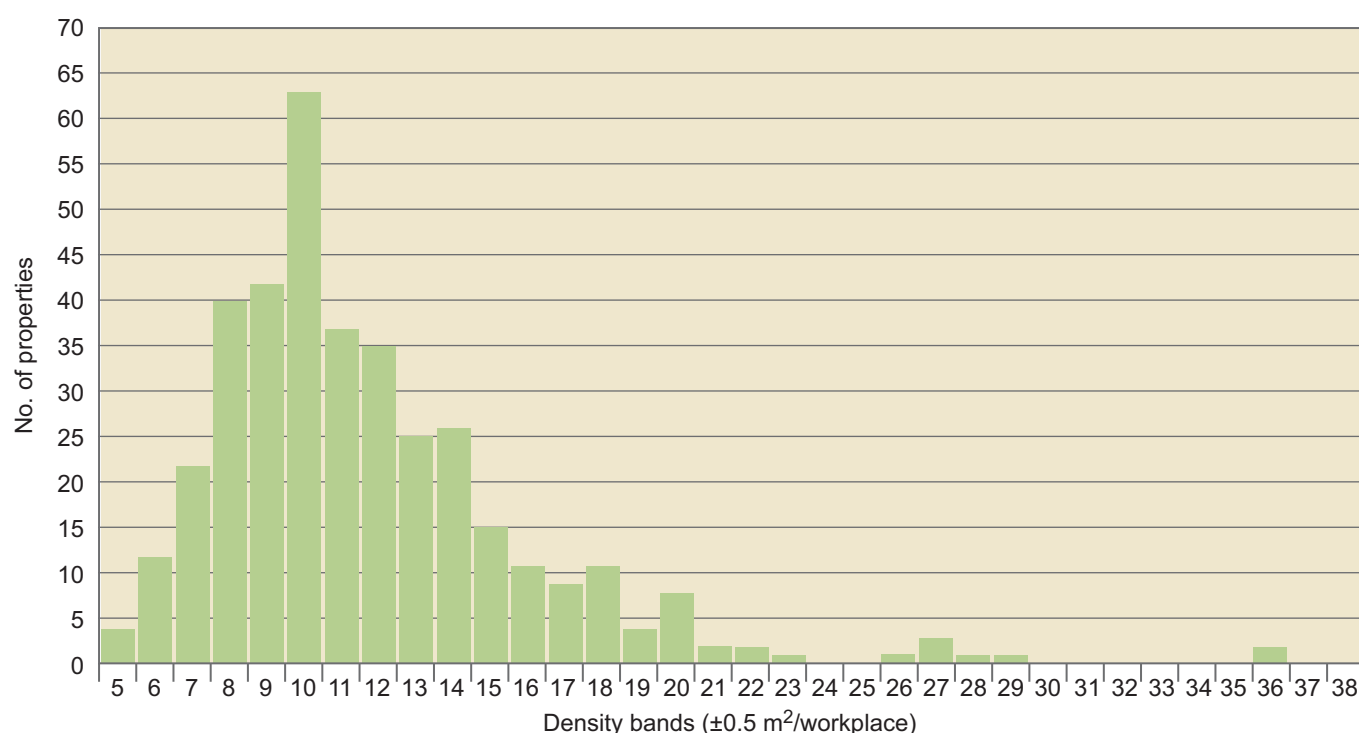


Figure 4 Whole-sample building densities by density band.

By contrast, there are also a number of properties which exceed 25m². This latter group is statistically insignificant in terms of the overall result, and we have excluded it from the analysis in certain charts in this report simply for clarity of presentation purposes.

Figure 5 compares the 2013 data set with that from the 2009 study in terms of size bands. The graph shows some interesting dynamics:

- an increase in the proportion of properties occupied in the higher 6–7m² range
- an increase in the proportion of properties occupied in the lower 14–16m² range
- a reduction in the proportion of properties occupied in the 9–11m² range.

One possible explanation for this is that Financial & Insurance firms (the largest sector in the sample) have moved more quickly than other sectors towards higher densities, reducing the mid-range representation, with a knock-on effect on the lower density ranges.

It is interesting to compare these results with those of the 2009 study (Table 3). It can be seen that the proportion of both higher densities and lower densities

has increased relative to a decrease in the proportion of properties in the middle size band.

At the denser end of the spectrum the differences between 2009 and 2013 are possibly explained by a combination of the following:

- a higher proportion of insurance sector properties in the sample
- continued increases in occupation density in the intervening period as some sectors (e.g. insurance and finance generally) continue to intensify use.

At the other end of the spectrum the larger sample appears to be more balanced, with a smoother tail.

Table 3 Comparison of the 2009 and 2013 data sets by size band.

STUDY	PROPORTION OF PROPERTIES (%)		
	<8m ² NIA	8–13m ² NIA	>13m ² NIA
2009	5	77	18
2013	10	64	26

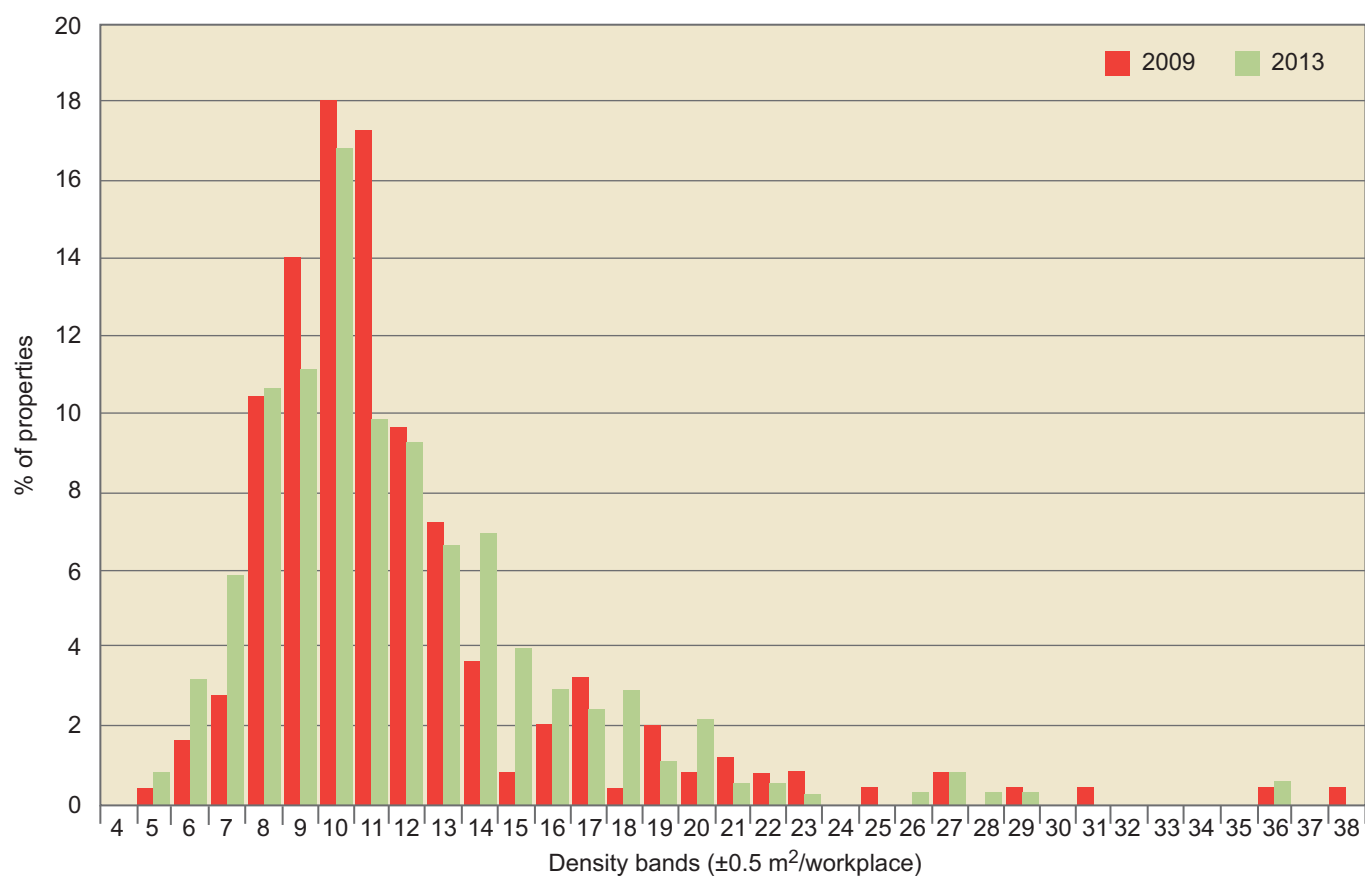


Figure 5 Density bands, 2013 and 2009 compared.

SECTOR ANALYSIS

All the companies in the sample were grouped into five key sectors:

- Financial & Insurance
- Professional Services
- Technology, Media & Telecoms (TMT)
- Corporate
- Public Sector.

The Professional Services sector includes lawyers, accountants, management consultants and property companies. The Corporate category includes energy, engineering, food, manufacturing, mining, property and retail companies. The Public Sector category includes central government, local authorities and the third sector.

Figure 6 shows the sector breakdown of the sample, and compares the current findings with those of the

2009 study. The 2013 breakdown shows 40% of the sample in the Financial & Insurance sector, and a further 26% in Professional Services. The TMT and Corporate categories contribute 15% and 13%, respectively, to the sample, while the Public Sector comprises 6%.

The comparison with the 2009 study shows that the most recent data include a larger representation by TMT and Corporate occupiers, and less from Public Sector and Professional Services.

As part of our study we compared the 2013 BCO sample data with the IPD data set. The BCO mean density of 10.9m² was lower than the IPD mean of 9.9m². However, the IPD data set contained a significantly higher representation from the Financial & Insurance sector. In order to compare the two data sets we 'recalibrated' the IPD data set to reflect a similar sector breakdown. Once this exercise was completed,

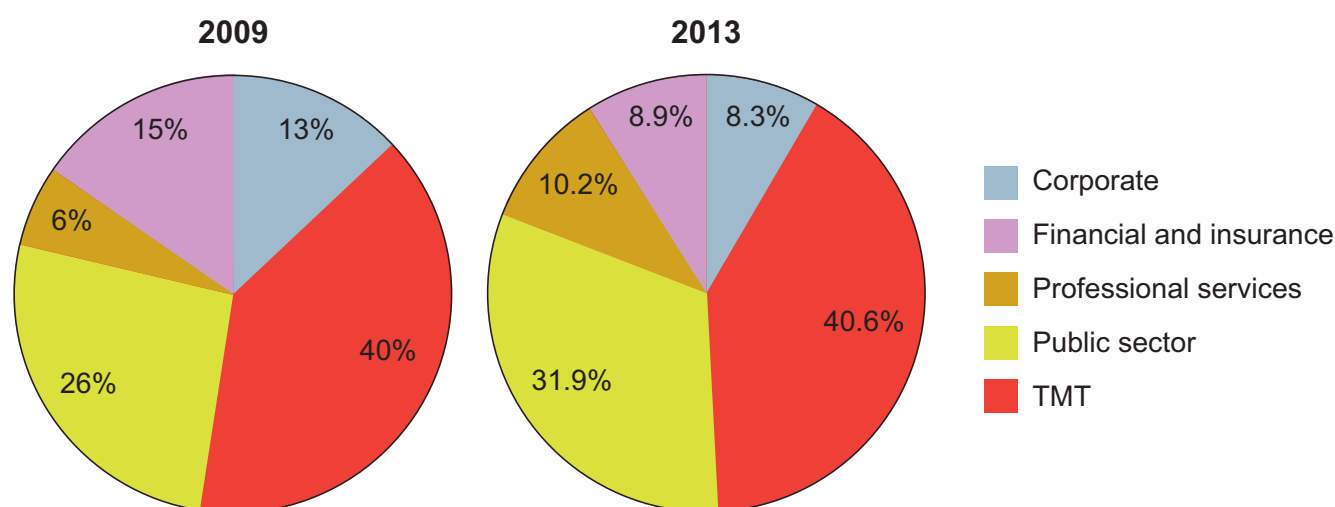


Figure 6 Sector breakdown, 2013 and 2009.

the IPD mean moved much closer to the value in the BCO sample, averaging out at 10.8m².

The results of the sector analysis are shown in Table 4. It can be seen that the sector spread is wide, reflecting different prevailing workstyles within the sectors. The figure of 13.1 for the Corporate sector reflects a predominance of headquarters' functions and a high proportion of client entertainment and meeting space. The Financial & Insurance sector shows the highest overall density, and this reflects a large representation of back-office and contact-centre functions, as well a generally more aggressive approach to densities in general office areas. This is particularly the case in the insurance sector.

Figure 7 shows results for a number of sectors to illustrate the diversity between the various industry groupings. The mean density for the Financial & Insurance sector is 9.7m². This is the highest density sector across the sample, which is no surprise. Many banks and insurance companies have tightly packed

areas, such as trading floors, but they also tend to occupy general office space at higher densities. The sector also shows a relatively tight distribution, with a large number of cases in the 7–11m² range.

The mean density for Professional Services, including lawyers, accountants, management consultants and property companies, is 12.3m². This sector shows a wider distribution than the other sectors, and this is explained by a couple of key occupancy characteristics. Management consultants have a greater propensity for flexible working styles, and they provide many of the higher density results. By contrast, lawyers typically retain a higher proportion of cellular and allocated space, thus providing more of the lower density results. It is thus quite a divergent sector in density terms. The data show that the mean density for accountancy organisations is 11.1m²/workplace while the equivalent figure for legal firms is 17.3m²/workplace.

The mean density in the TMT sector is 10.5m². The graph illustrates quite a tight bunching of results, with by far the greatest number of cases lying between 8m² and 11m². The TMT sector is a very diverse one, including large corporate environments with tightly planned layouts, as well as more creative, looser layouts. The mean value for this sector should thus be treated with caution.

The mean density among Corporate occupiers is 13.1m². This sector includes energy, engineering, food, manufacturing, mining, property and retail. Many of the occupations were headquarters functions. The data show a wider distribution than the other sectors shown here, with much weaker concentration around certain densities.

Table 4 Overall sector analysis.

SECTOR	m ² NIA
Corporate	13.1
Professional Services	12.3
Public Sector	12.1
TMT	10.5
Financial & Insurance	9.7

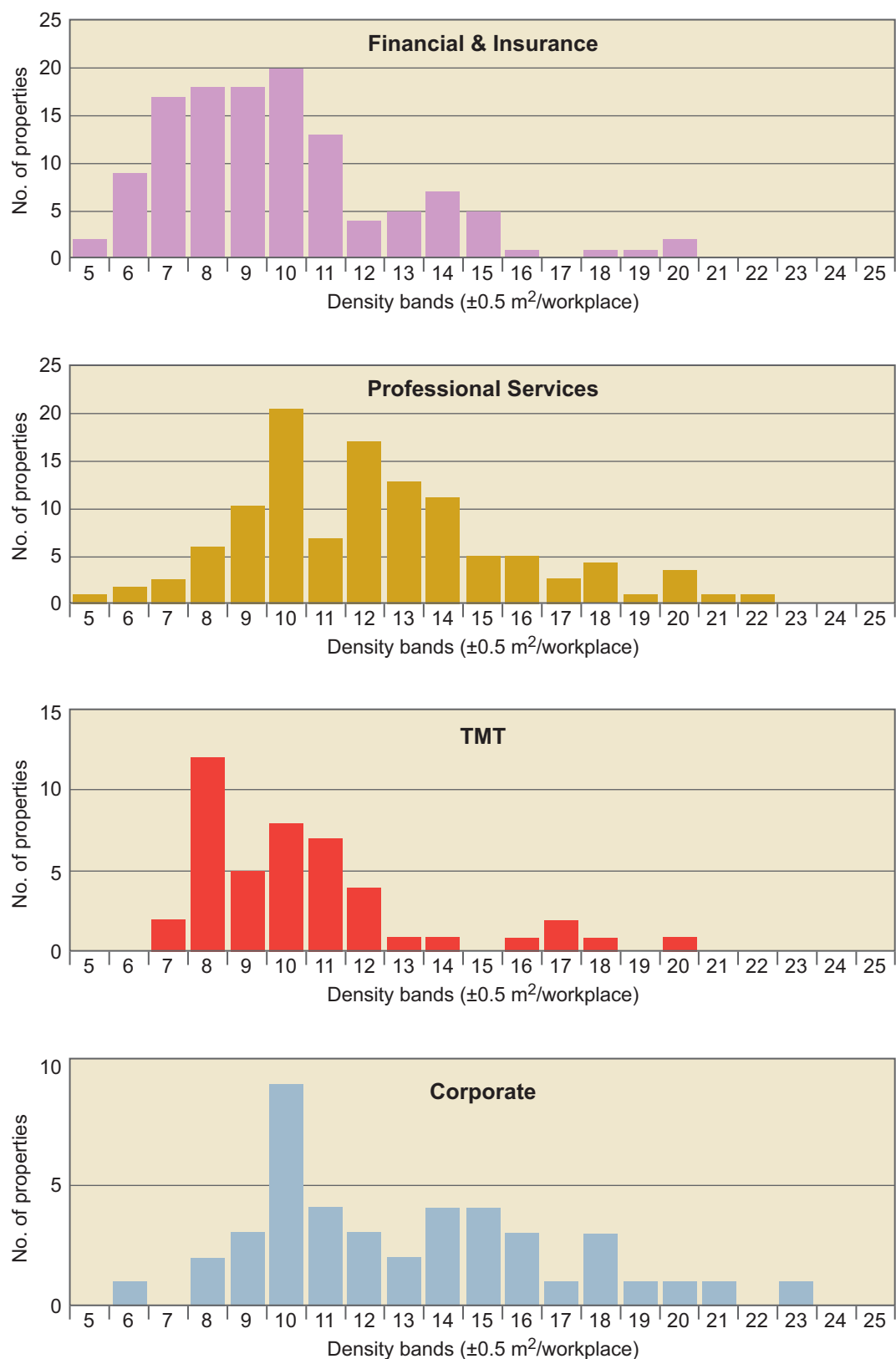


Figure 7 Distribution of densities by sector.

REGIONAL ANALYSIS

We analysed the sample in terms of eight broad regional categories. Table 5 shows the density from the lowest to the highest. It is perhaps a little surprising to record that London and the south east have lower densities than all but one of the other regions, as it is generally perceived that London densities are higher due to the higher land costs (rent).

There are possibly two, at least partial, explanations for this. First, a relatively high proportion of new buildings in the regions have been built for call centres, contact centres and back offices, and are therefore used more intensively. Secondly, London buildings typically have a greater proportion of space allocated to lower density uses such as client entertainment and meeting space. Neither of these traits is verifiable in this study, but they might help explain at least some of the difference.

Figure 8 shows density bands by region for three example regions. The charts illustrate well why the

Table 5 Regional densities.

REGION	m ² NIA
South east	12.7
Wales	11.4
London	11.3
Midlands	10.2
North	10.1
Scotland	9.7
East	9.4
South and west	8.6

south east mean density (12.7 m²), for example, is significantly lower than that for London (11.3 m²), with a wider spread of values. Similarly, the high density recorded in the south and west (8.6 m²) can be seen in the chart, with a tighter bunching of results.

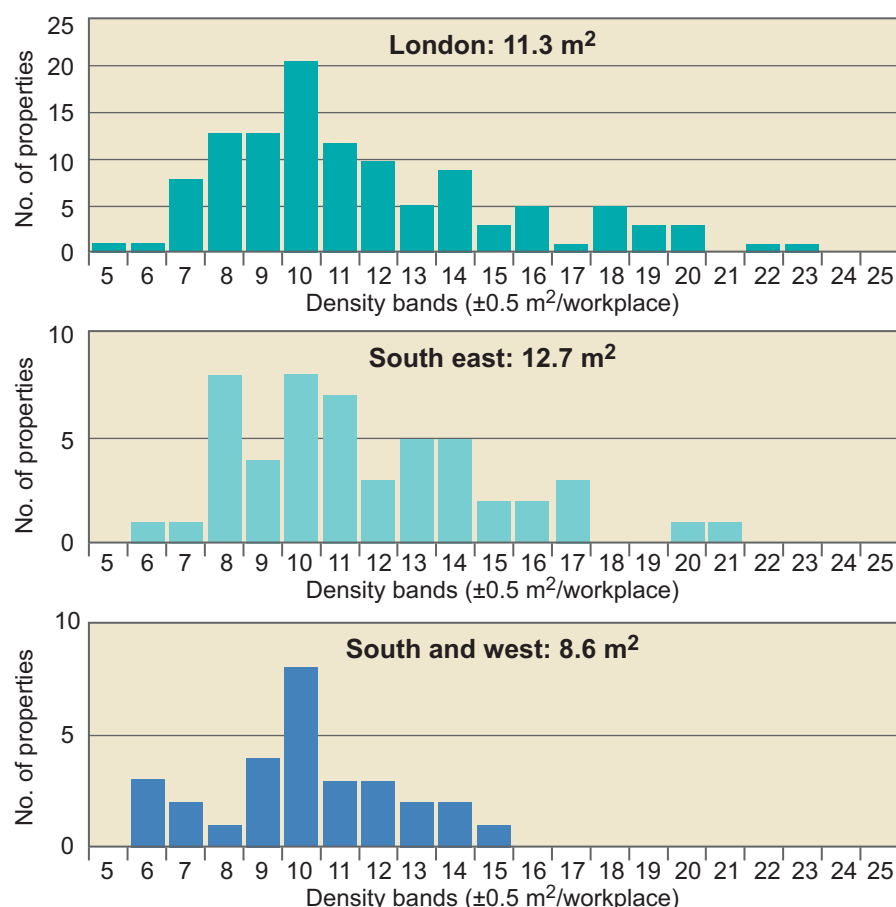


Figure 8 Density bands by region.

FLOOR-BY-FLOOR ANALYSIS

Mention has already been made in Occupation Density (see p. 10) of the significance of density diversity across buildings – some parts of buildings are occupied at far greater densities than other parts. The most obvious example is the contrast between client entertainment and meeting floors and general office areas.

We analysed our sample on this basis to understand the level of diversity, and the overall results are captured in Figure 9. The graph shows those floors populated with workplaces arranged in order of decreasing density. More than 50% of these floors have a density of 1 workplace per 10 m².

Figure 10 develops the chart in Figure 9, showing more detail of the proportion of floor density bands by number of floors and total area studied. In terms of floors, 26% of floors fall into the less than 8 m² band, while a further 21% fall into the 8–10 m² band and 16% in the 10–13 m² band. It will also be seen, importantly, that 14% of the floors studied are dedicated to support functions and have no workplaces. While not accommodating workplaces, these might be densely occupied at various times, as conference floors or cafeteria, for instance.

The potential effective density of a floor dedicated to conference use is likely to be equivalent to the most densely occupied office floors. It is worth noting in passing that a meeting seat on a conference floor is

likely to be occupied by someone who has vacated a workplace in this or another office building. A tightly scheduled world of work where all workplaces and all meeting seats (not to mention other workplace settings) are occupied at any one time is likely to remain illusory.

In terms of area studied, 27% of the total area falls into less than 8 m² band, and a further 25% falls into the 8–10 m² band. As a proportion of total area studied, space dedicated to support functions falls to 6%.

Finally in this floor-by-floor analysis, Figure 11 shows a breakdown of floor densities comparing data from this study with that of the 2009 study. The main points to extract from this chart are the contrasting results either side of the mean. Thus, the proportion of floors falling into the tighter size bands of 6–7 m² has risen very significantly, while in the lower density bands of 10 m² and 12 m², the proportion has fallen, albeit to a lesser degree.

The explanation for these trends is not clear in the context of the overall change in the headline density figure, from 11.8 m² to 10.9 m². The simple explanation, given that all bands above 10 m² in 2013 (with the exceptions of 13 m² and 15 m²) have fallen, is that there has been a general tightening of densities. The result suggests that the recession has not led directly to a fall in density levels.

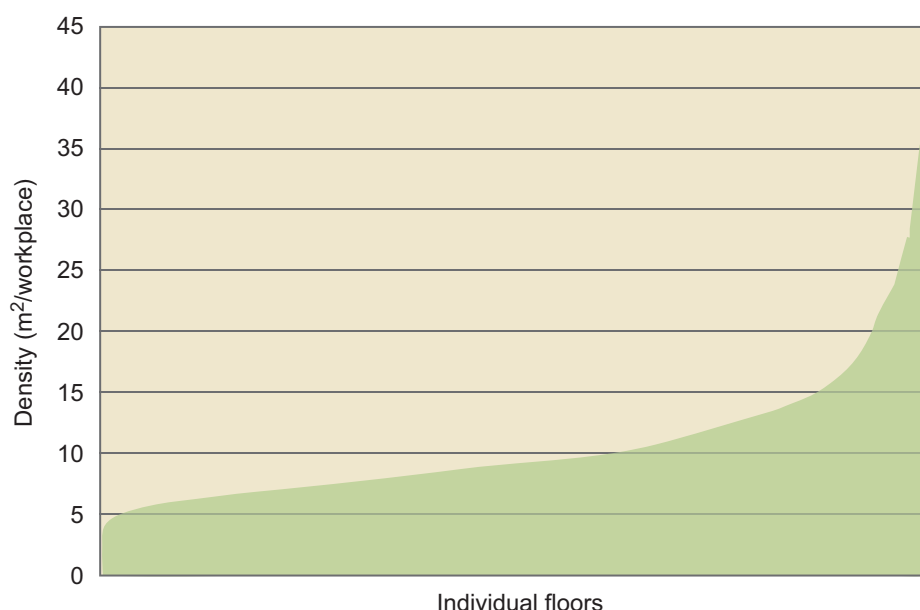


Figure 9 Floor-by-floor analysis.

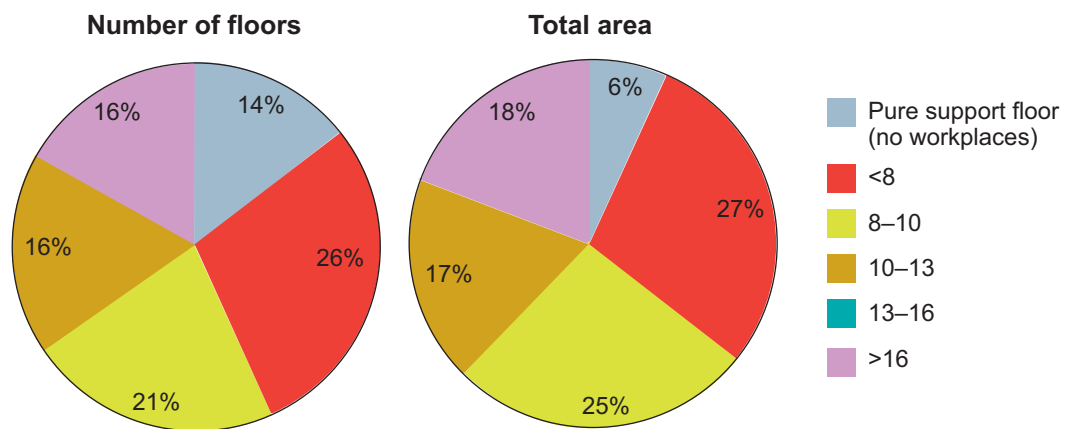


Figure 10 Distribution of densities by floors and by area.

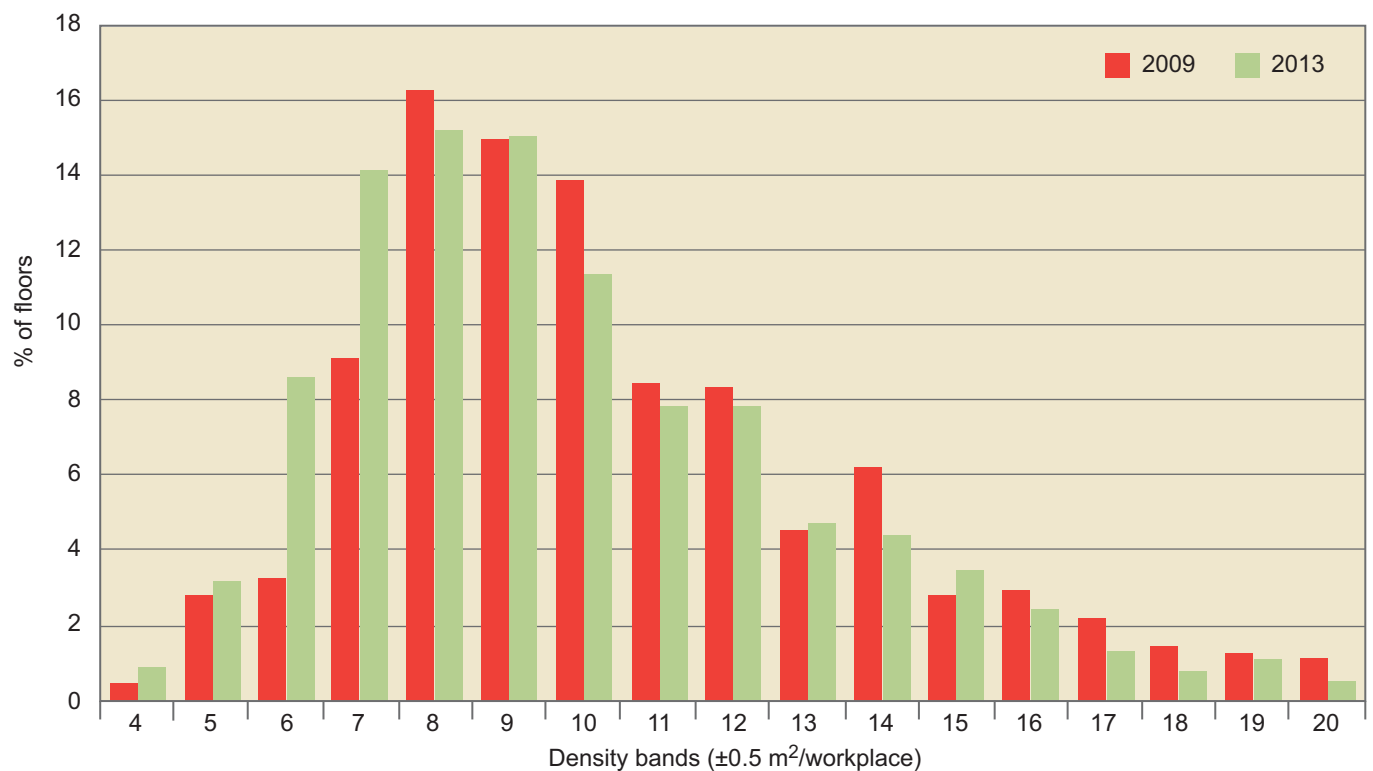


Figure 11 Comparison of floor densities, 2009 and 2013.

DENSITY AND SIZE OF PROPERTY

Figure 12 shows a scatter graph of the relationship between density and size of property, highlighting the overall sample mean line of 10.9m^2 . The chart shows,

in fact, that there is a very weak relationship between the two variables.

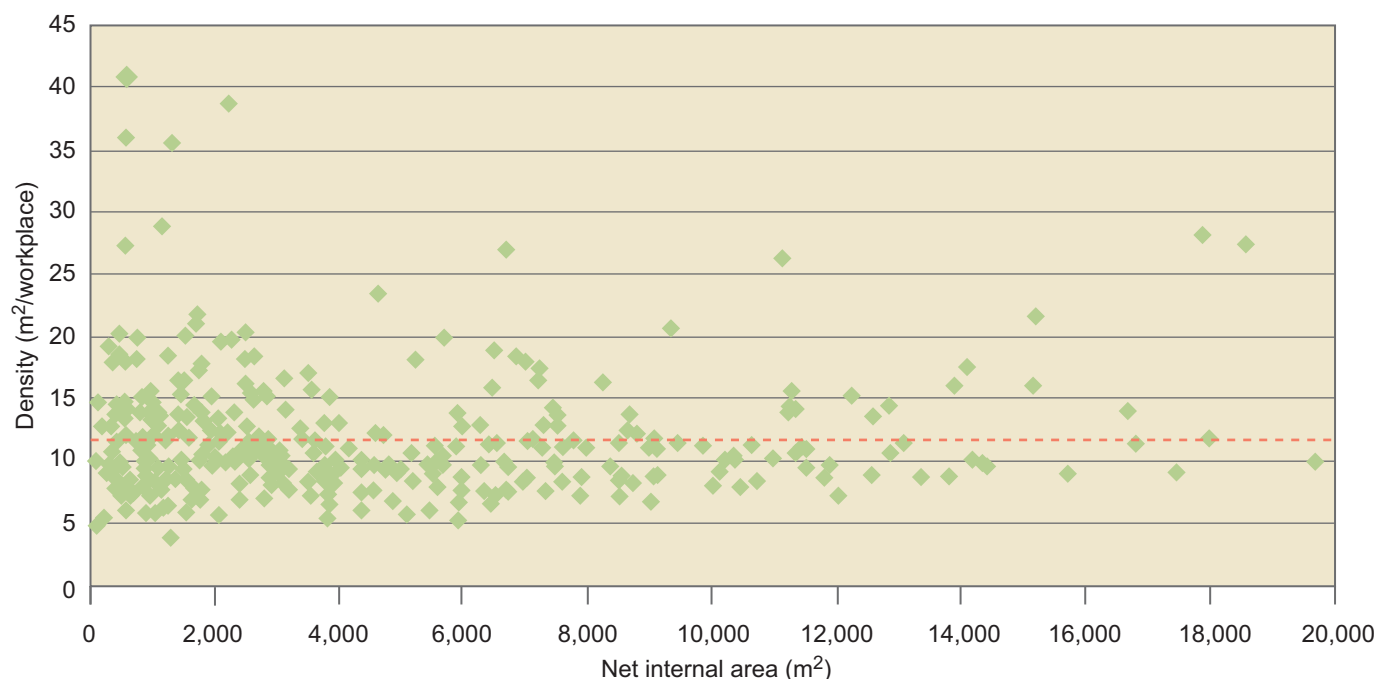


Figure 12 Scatter graph of density by size of property.

EFFECTIVE DENSITIES

On page 12 we discussed the concept of effective densities. Here we examine the impact of this concept on our sample. Figure 13 shows effective densities in buildings by density band, assuming four different utilisation rates (the orange bars show values of 10m^2 or less, i.e. reflecting current BCO guidance). The

same results are summarised in the Table 6.⁵ It can be clearly seen that, as the building utilisation rate falls, so does the proportion of properties with higher densities, and the proportion with lower densities rises. Thus at 100%, 64% of properties have densities between 8m^2 and 13m^2 . By the time utilisation rates reach 70%,

Table 6 Effective density for four utilisation rates.

EFFECTIVE DENSITY (m^2 NIA)	BUILDINGS (%)			
	Utilisation 100%	Utilisation 90%	Utilisation 80%	Utilisation 70%
<8	10	5	2	0
8–13	64	61	48	31
>13	26	33	50	69

5. The bars shown in green on the charts show values of 10m^2 or less, i.e. they reflect current BCO guidance.

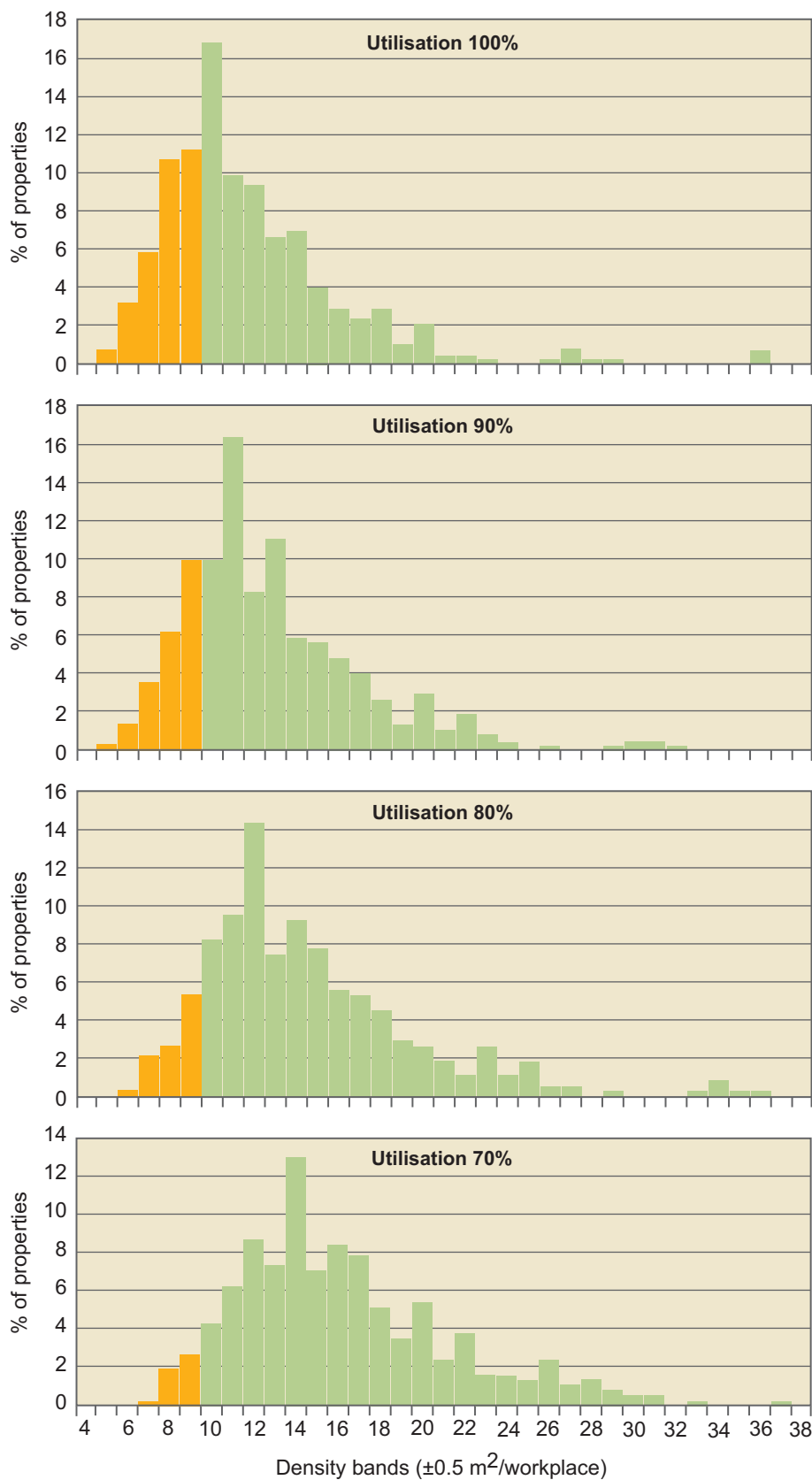


Figure 13 All buildings, effective density bands at different utilisation rates.

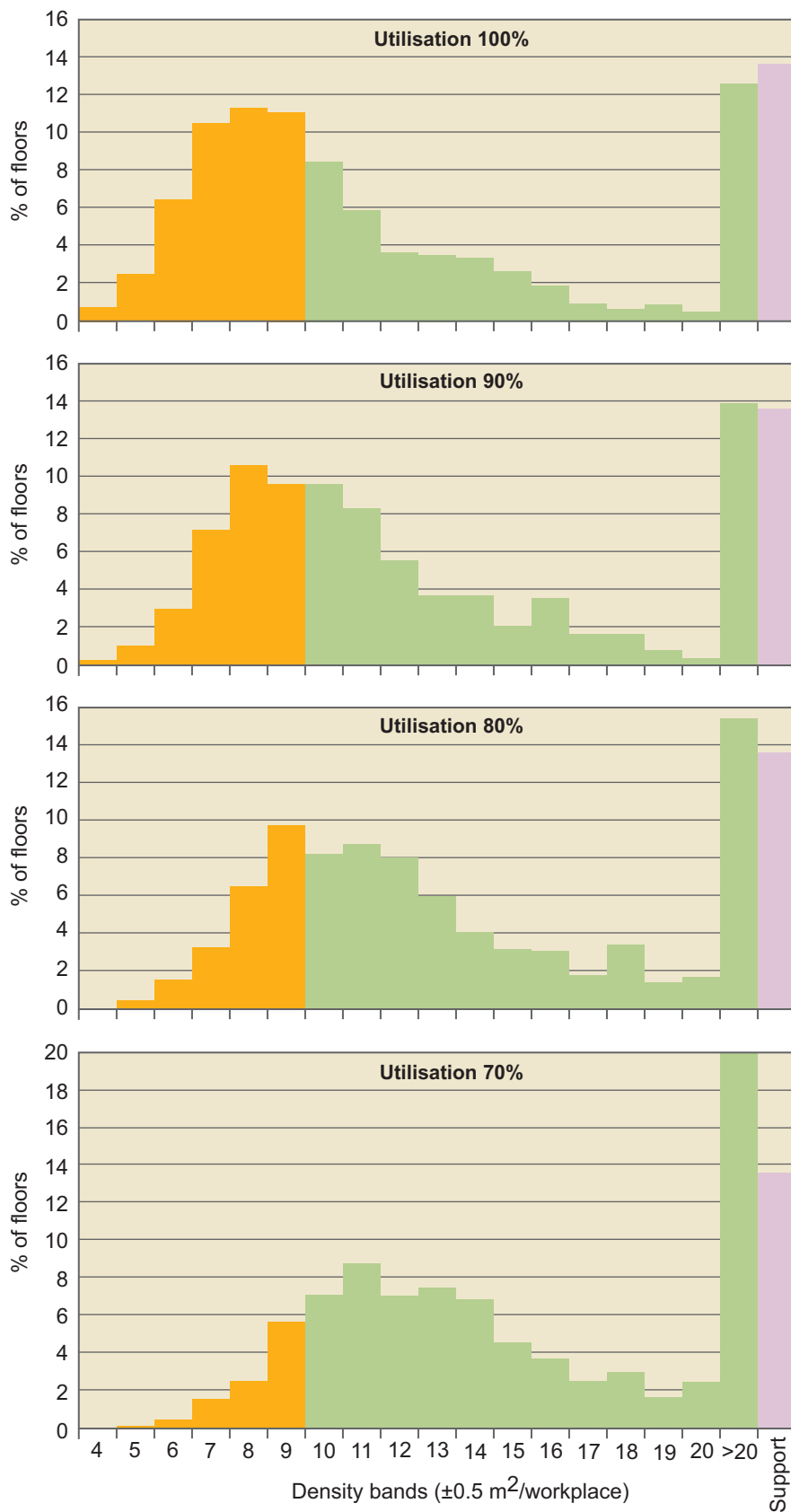
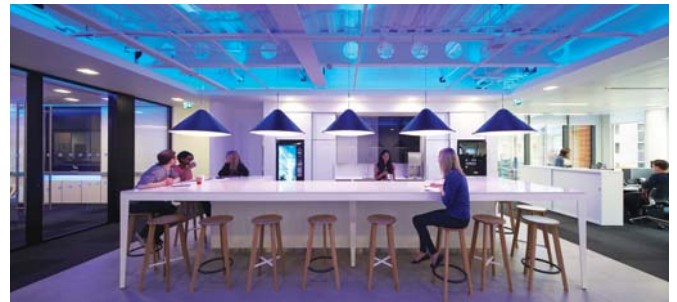


Figure 14 All floors, effective density bands at different utilisation rates.

which in practice is common, this number has fallen dramatically. The graphs clearly show the importance of considering effective densities alongside the more traditional measures of density.

There is a particular reason why we have chosen to illustrate the effective density with these utilisation ratios. While there are many examples of organisations measuring utilisation as part of the briefing investigation for major workplace transformation, true utilisation rates are only measured on a regular basis by a small number of organisations, principally in the technology and management consultancy sectors, where sophisticated workplace-sharing regimens (leading to higher occupancy rates) have been common practice for many years. It would appear that, in these surveys, mean utilisation rates of 60–70% are commonly observed: utilisation rates of 80% are typically a target rather than a reality in most instances.

Mean and peak utilisation rates may have different implications for planning building infrastructure. For example, means of escape would need to be designed around occasional peaks.



Having undertaken the analysis of effective densities on a building-by-building basis, we ran the same analysis by floor. Figure 14 shows the results. Again, it can be clearly seen that, as the utilisation rate falls, so does the proportion of floors with higher densities, and the proportion with lower densities rises. Thus at 100% utilisation, around 42% of properties have densities of 9m² or less; and by the point at which utilisation rates reach 70%, this proportion has fallen dramatically to around 12%. While this is happening, the number of floors with much lower densities increases.

DENSITY OVER TIME

The point was made in Occupation Density (see p. 10) that occupation densities have been rising over recent years. There is much anecdotal evidence to support this contention, as well as a number of different studies (albeit studies using different methodologies and sampling approaches). As part of this study we analysed the IPD data set to look for evidence of change over the relatively brief period of 2009 to 2012. Figure 15 shows the

overall mean density over this period, taking the data from the whole data set at each time point. The graph shows very little change in occupation density; indeed, there is a slight increase during the latest time period.

In Figure 16 we present the data representing only those buildings that appeared in each of the five data points. This subsample measured some 0.3 million m².

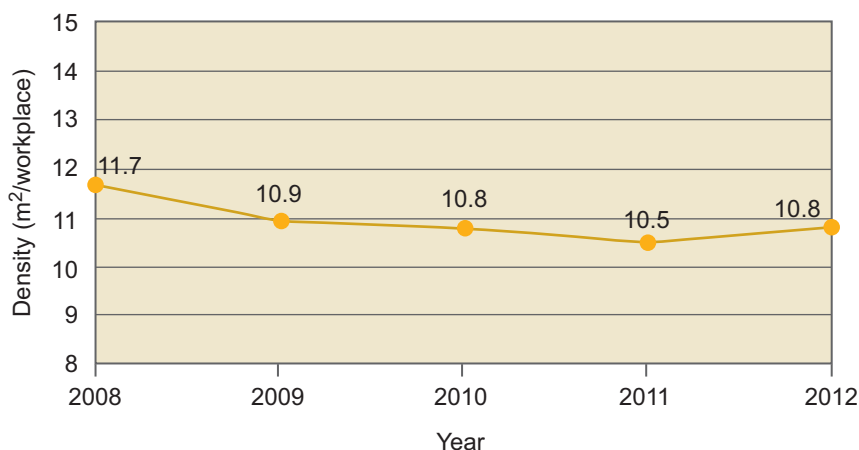


Figure 15 IPD data: overall mean density over time.

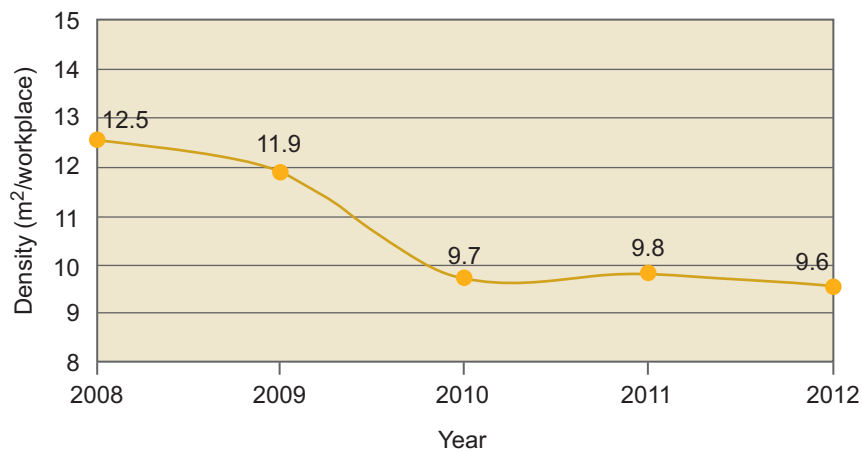


Figure 16 IPD data: overall mean density for the same buildings over time.

In contrast to Figure 15, there is a clear trend towards higher densities, falling from almost 13m² to under 10m². The implication is that the rate of increase in

occupation densities has begun to slow as the market reaches a 'level', beyond which perhaps the benefits of increased efficiency diminish.

CONCLUSIONS

The sections Occupation Density (see p. 10) and Data Analysis (see p. 14) in this report have set out the main statistical findings of our survey work. In this section we add to this quantitative analysis with a more discursive section in which we outline some of the key issues

surrounding the current debate about occupation densities. We have included in this discussion the feedback that we have received from the market practitioners who we interviewed for this project.

HEADLINE RESULTS

This study has analysed the largest sample ever assembled to investigate occupation densities. The data set comprised 2,485,484 m² (26,753,753 ft²), spread across 381 properties and 1331 individual floors. It is, therefore, a very robust sample.

The overall analysis produces a mean density of 10.9 m² NIA. This compares with 11.8 m² in the 2009 study, representing a significant shift, but one which is in line with a longer term trend that suggests a potential slowing down of the rate of increase in densities. Of the total sample, 38% of the properties fall within the 8–10 m² range, while 58% fall within a wider 8–12 m² range.

When the 2013 data set is compared with the one in the 2009 study in terms of size bands, some interesting dynamics emerge with increasing proportions of some higher and lower density bands, and an increased proportion in the 9–11 m² density demand. One possible explanation for this is that Financial & Insurance firms (the largest sector in the sample) have moved more quickly than other sectors towards higher densities, reducing the mid-range density representation, with a knock-on effect on the lower density ranges.

A breakdown by sector shows that 40% of the sample is in the Financial & Insurance sector, 26% is in Professional Services, 15% is in TMT, 13% is in Corporate and 6% is in the Public Sector. The lowest density is in the Corporate sector (13.1 m²), while the highest is in the Financial & Insurance sector (9.7 m²). Between these, Professional Services average 12.3 m², TMT averages 10.5 m² and Public Sector averages 12.1 m².



A breakdown by region shows that the south and west region has the highest density, at 8.6 m². London and the south east have lower densities than all but one of the other regions, with 11.3 m² and 12.7 m², respectively. This is partly explained by the fact that London buildings typically have a greater proportion of their space allocated to lower density uses such as client entertainment and meeting space.

TRENDS AND DATA

A reverse hockey stick?

Evidence presented here (see Density Over Time, p. 25), and a host of anecdotal evidence, suggests that densities have risen over recent years as demand has responded to the need to reduce property costs, and as technology has enabled flexible working styles. Evidence from the 1990s (Roger Tym & Partners, 1997; Arup Economics and Planning, 2001; Gerald Eve, 2001) suggests that densities were then, on average, around 15–17 m²/workplace. This is around half as dense as many offices are being planned today (Figure 17).

It is to be expected that this increasing density will level out at some point. If nothing else, personal comfort will be a limiting factor. We have presented some tentative evidence here, based on IPD time-series data (see Density Over Time, p. 25), to support the view that densities are levelling out.

The question therefore arises: is the occupier market reaching a point at which mean densities overall will cease to increase further, or is there perhaps a further increase yet to unfold? The answer has important implications for future guidance on specification. If the relatively steep fall in mean occupation densities over recent years is levelling out, this suggests a lessening need to enhance specification of buildings in order to address higher densities.

From the particular to the general

Despite the evidence that density averages might be levelling out, it was reported during our stakeholder

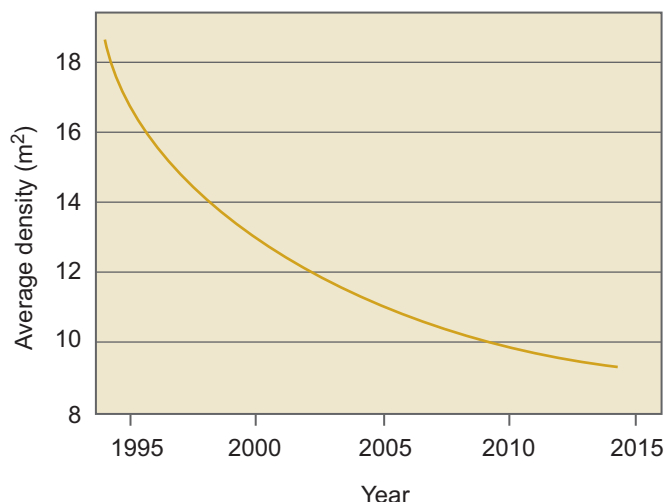


Figure 17 Schematic of increasing densities.

interviews that there is a perception among some advisors that density levels are continuing to rise. Furthermore, it was found that this perception is largely informed by recent leasing activity in the City of London. While certain leasing deals might well be anticipating high densities, caution needs to be exercised in extrapolating from the particular to the general.

A further enhancement in design specification would be a significant step, not least because of the implications for construction costs, net-to-gross ratios and environmental considerations. It is imperative, therefore, that the perception of change is borne out by reality and is demonstrable across a broad cross-section of the occupier market in different locations.

OCCUPIER CHARACTERISTICS

Market diversity

One of the key issues here is the extent to which design guidance is determined by the specific needs of a small sector of demand. This subset of demand is typified by large occupiers of (often) central London buildings, who have specific demands in terms of trading floors and other specific high-use areas within buildings.

In other words, does the guidance reflect a narrow segment of demand, perhaps encouraging a 'one size

fits all' approach to specification? Should, for example, an office building on a regional business park be built to the same exacting standards as a large building in the City of London? Or should a building targeted at the financial sector in the core of the City be designed in the same way as one built in the West End for a media business?

Demand is highly diverse. For example, in the City of London, while there are 85 occupied units of over

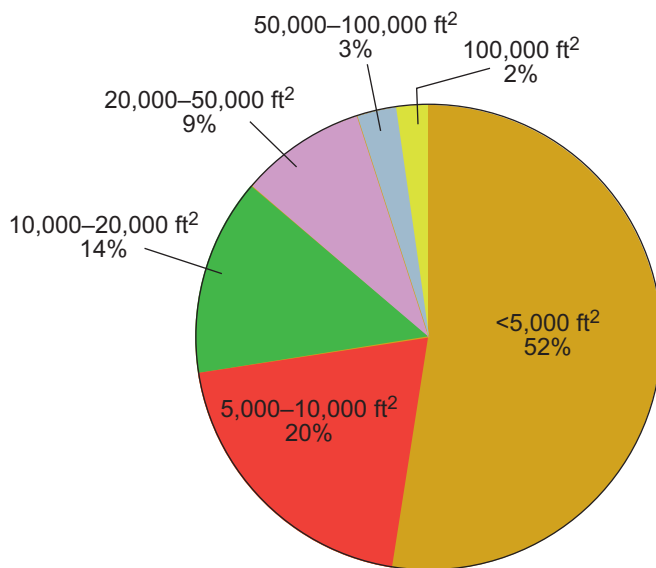


Figure 18 Breakdown of occupied units in the City, by size band.

Source: Ramidus Consulting (2013) *Taking Stock: The Relationship between Businesses and Office Provision in the City*. Corporation of London.

100,000 ft², there are almost 3500 units of less than 50,000 ft². Figure 18 shows a breakdown by size band.

Clearly the demands of such a diverse market will vary widely. For example, in a generally weak letting market through 2012 and 2013, the insurance sector has been very active in the City of London, and a number of large transactions have taken place. The work-style characteristics of this sector are typified by high densities and regimented layouts, which contrast with another active sector – TMT companies – which are typically smaller occupiers, with a more ‘loose fit’ approach to workstyles.

The lessons of effective density

In this report we have examined effective densities. It is clear from a wide range of empirical work that the densities to which buildings are designed, the densities to which they are then planned, and the densities at which they are in fact occupied (both peak and mean), are all very different. Furthermore, as workstyles continue to change, with greater mobility, a greater emphasis on collaborative work and more interaction between organisations, so patterns of occupation are changing.

The same empirical work also shows that, even in organisations that have introduced flexible working styles, in the expectation that utilisation rates would increase substantially, occupancy levels very rarely exceed 80%, and more typically run at 60–70%. Effective density is a more reliable guide to actual occupation density than relying on a simple workstation density.

Local density and building density

As workstyles continue to change, with greater mobility, a greater emphasis on collaborative work and more interaction between organisations, so patterns of occupation are changing. While at one time a typical space budget might have comprised 80% fixed desks, 15% meeting space and 5% other support space (post rooms, computer rooms etc.), today’s typical office is more dynamic.

A space budget today is more likely to have a wider variety of workstation settings, but these making up a smaller proportion of the overall space budget (Figure 19). The main factor causing the shift is a growth in meeting space – formal meeting rooms as well as more break-out space, collaborative space and other forms of space to cater for mobile working.

The typical response is to plan the allocated workplaces to a high density (say, 8 m² NIA), while allocating discrete areas of buildings to meeting and shared

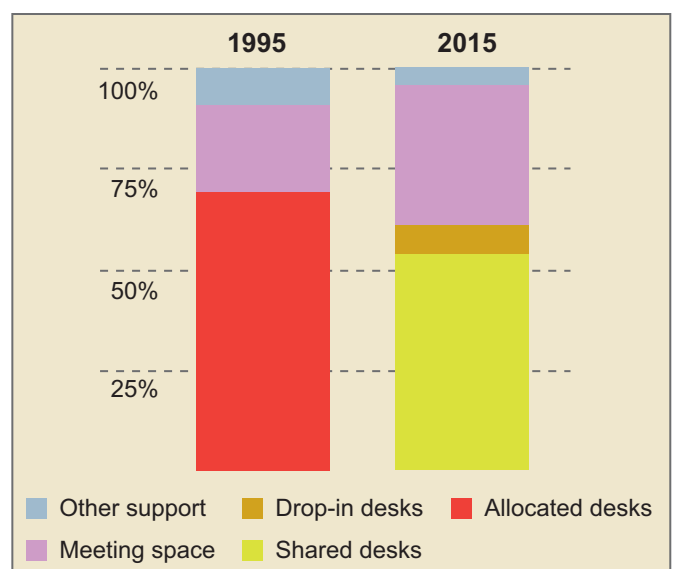


Figure 19 Model of contrasting space budgets, 1995 and 2015.

space, where workplace densities will be lower (say, 18 m² NIA). Overall there might be a density of 10 m².

The question here is whether the whole building should be designed to cope with the higher densities, or

whether there should be local provision to cope with high local loads. Most, if not all, buildings should have the potential to increase densities locally. Support floors with few workplaces are not necessarily low density, and therefore require the potential for enhancement.

SPECIFICATION

The cost of overspecifying

The flip side of enhancing building specification to cope with higher densities is that it leads to overspecification, and this in turn adds cost to construction, adds cost to life cycle and is environmentally unsound.

Of course, occupiers require flexibility, to be able to change layouts and use profiles as business changes dictate. The issue is whether blanket provision is the answer.

It might be argued that a higher specification building can be 'turned down' in performance terms if it is not occupied to the optimum level, and that this will extend the life of the plant etc. But is this what happens in

practice? Will occupiers really adjust systems to suit differing densities over time?

Adaptable buildings

The point about future proofing (see above) can be answered to a large extent by enabling buildings to adapt over time to local increased demands on building services. Our discussions with developers and advisors underlined that many buildings are already designed at, say, 1:10 across the majority of space with, say, 1:7 in a minority of the space. Buildings that are designed to adapt over time, responding to higher and lower utilisation rates over a building's life cycle, will be more flexible in occupier terms.

THE FUTURE

Future proofing or overproviding? If we are indeed reaching a long-term baseline in densities (see A Reverse Hockey Stick? on page 28), then why should design specification standards be enhanced further? The answer lies in uncertainty and risk management, expressed by some advisors as 'future proofing'.

According to the future proofing argument, densities have been rising, and we do not know for sure what the future holds. These are both reasonable stances, certainly in the absence of hard data on trends, which are then built into risk management, or future proofing, by assuming the trend to higher densities continues.

However, there is no evidence we are aware of which suggests that any buildings constructed in the past, say, 15 years have been unable to cope with higher densities due to their design standard of 1:10 (or even 1:12). Should the optimum flexibility afforded by high specification, and required by a relatively small

segment of the demand market, justify its blanket provision? The results of this study do not suggest a need to raise specification further to accommodate higher densities.

Guideline or standard?

The *BCO Guide to Specification of Offices* has become accepted across the property industry, and is widely referred to and adopted by advisors, designers, developers and investors.

We are aware, for example, that institutional purchasers of office buildings benchmark against similar properties, and that, irrespective of occupier needs, they compare specification, favouring buildings with higher specification. The resulting higher value reinforces the cycle towards generally higher specification. The relevant issue here is whether the densities part of the *Guide* has become, in reality, more of a prescriptive standard than a guide.

A change to guidance?

While showing an increase in densities from the previous survey in 2009, the findings of this study remain broadly in line with current BCO guidance on densities. However, the study has emphasised the need to design for diversity, allowing densities to be

raised locally in all buildings (not just those for users such as banks with trading functions). Post-occupancy studies should be encouraged, particularly in those sectors deemed to require a higher density, such as insurance, to test whether actual occupation is really driving enhanced specification.

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CONTRIBUTORS

Data contributors

We acknowledge and thank the BCO members – occupiers, owners and advisors – who gave their time and energy to the collation of data covering nearly 2.5 million m² of occupied stock. This is a very large sample, and will provide a strong evidence base for the forthcoming *2014 BCO Guide to Specification of Offices*. The organisations that contributed data are listed in the box on the right of this page. It should be noted that a number of organisations that contributed data preferred not to be acknowledged.

Particular mention should be made of our design consultancy peer group, composed of leading design consultancy organisations, who shared with us both data and intelligence over the course of the study. They were HAA, MCM Architecture, Strategy Plus Aecom and TP Bennett.

Perception study

Finally, we would like to thank all those who took part in our perception interviews. These were held with: British Land (Paul Burgess), Bruntwood (Chris Oglesby), Cushman & Wakefield (Digby Flower), Derwent London (Benjamin Lesser and Simon Taylor), DTZ (John Forrester and Richard Golding), Jones Lang LaSalle (Neil Prime) and Stanhope Properties (Ron German, Jason Margrave, Rob Watts and Henry Williams).

Aviva
British Telecom
Buro Four
Credit Suisse First Boston
Deloitte
Deutsche Bank
Dorrington Properties
Gleeds
Grosvenor
GVA
HAA
Helical Bar
Hurley Palmer Flatt
Ian Simpson Architects
ING
Johnson Controls
Jones Lang LaSalle
KPMG
Leslie Clark
London Borough of Brent
Manchester City Council
MCM Architecture
Nomura
Northern Trust
Paddington Central
Rider Levett Bucknall
Strategy Plus Aecom
Thornton Firkin
TP Bennett
UBS
Unilever
Vodafone

APPENDIX 1

THE 2009 BCO OCCUPIER DENSITY STUDY

The 2009 BCO *Occupier Density Study* reported on the largest and most thorough density study undertaken to that point. The report reflected a sample of 88 organisations, detailing occupancy levels in 249 UK properties. The buildings totalled 2,005,268 m² NIA (21,584,703 ft²), accommodating 173,000 workstations.

The report emphasised that, while density is a useful measure within the property industry, it also needs to be understood in the context of the functions being performed within the space, the technology applied, the manner in which organisations choose to plan and utilise space, and the work culture of the occupant organisations.

The report noted that, while the most typical measure of occupation density is workstation density – the NIA divided by the number of workstations – this is often wrongly reported as NIA per person. The report

also noted that studies of utilisation of workstations in buildings consistently reveal this to be significantly less than 100%, and often as low as 50%.

Over the whole sample, the mean overall density was 11.8 m² NIA/workstation. The median value was 10.6 m² NIA, with a wide range and a standard deviation of 4.6. The distribution of the sample shown in Figure A1 indicates that 77% of the sampled properties have an occupation density of 8–13 m² NIA/workstation, and 5% have a density in the range 5–7 m² NIA (a total of 82% at less than 13 m²). 18% of the sampled properties lie within the 14–38 m²/workstation band.

The higher densities are closely grouped around the mean. Two properties were occupied more densely than 6.0 m² NIA/workstation. The next nearest was 7.7 m² NIA/workstation. Overall, 25% of properties were occupied more densely than 9.2 m² NIA.

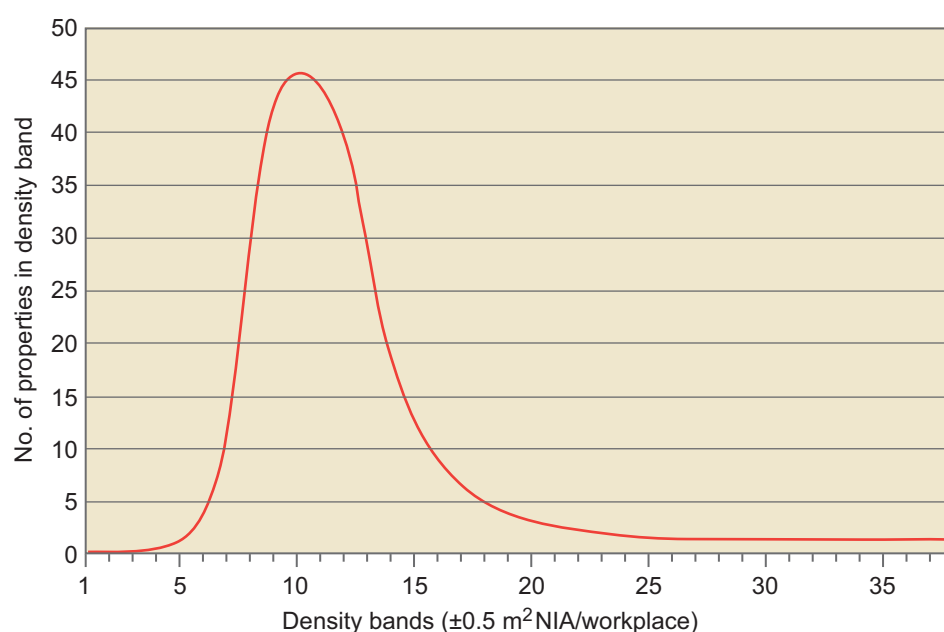
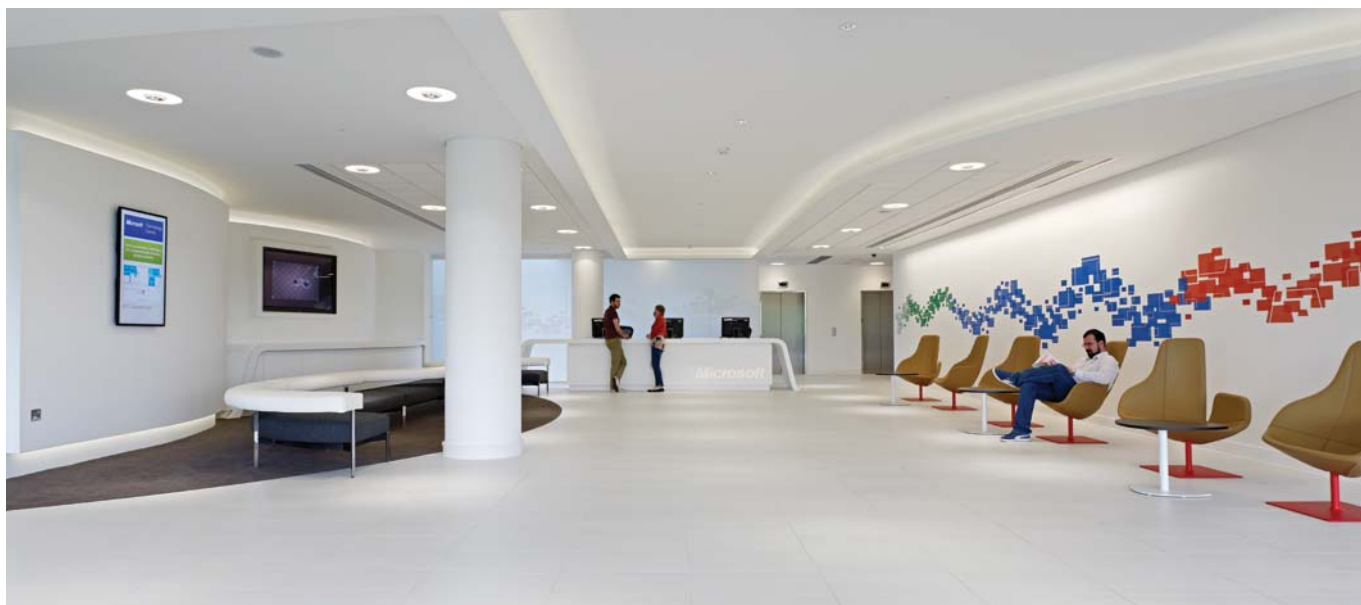


Figure A1 Distribution of densities across 2 million m² in 249 properties.



The lowest density recorded was 37.8m² NIA. The lower densities are less closely grouped around the mean – the graph has a long tail. 25% of properties were occupied less densely than 12.6m² NIA/workstation.

The report also revealed how different sectors occupied their buildings (Table A1). It showed that the legal and manufacturing sectors occupied far less densely than the norm. This is largely explained by the high provision of meeting facilities and by a particular style of space planning.

The table clearly shows that the Public Sector has also begun to improve the efficiency of its use of space. The data show central government averaging 11.9 sq m and local government achieving 10.1 sq m.

Table A1 Occupation densities by sector.

SECTOR	Mean density (m ² NIA)
Financial	11.0
Insurance	13.0
Manufacturing	16.0
Accountancy/management consulting	11.1
Legal	20.9
Other professional services	10.5
Real estate	9.9
Central government	11.9
Local government	10.1
Media	11.0
IT	10.0

APPENDIX 2

TECHNICAL NOTES AND DEFINITIONS

- **Area measurement.** Unless otherwise stated, all area measurements in this report refer to Net Internal Area (NIA), the most commonly used value when describing densities.
- **Building regulations.** These typically define requirements in relation to populations within buildings (or parts thereof), rather than stipulating occupational densities to which buildings must conform. The regulation that comes closest to specifying occupational density is The Workplace (Health, Safety and Welfare) Regulations 1992, which state that the number of persons employed at a time in any workroom shall not be such that the amount of cubic space allowed for each is less than 11 m³. In most offices this would be equivalent to a workplace density of between 4.0 and 4.2 m². Densities of this magnitude are unlikely to be experienced in reality, particularly in open-plan offices where the 'workroom' might be expected to include circulation routes and break-out areas in addition to workplaces.
- **Cellular offices.** Areas of enclosed workspace, both for individuals and small groups, where the means of enclosure is full-height partitioning.
- **Density and utilisation.** This report is aimed at informing the forthcoming *Guide to Specification*, and so is concerned with the maximum capacity of a building at any one point in time. In this sense, we have not addressed flexible working styles and higher levels of utilisation, beyond a brief discussion in the section 'Occupation Density' (see Occupation Density, p. 10), because they do not change the 'at any one point in time' discussion.
- **Flexible working styles.** A generic term to describe those office environments where there is at least a proportion of desk sharing. Such environments recognise the increased mobility of workers and the need for more collaborative work. The increased utilisation of workplaces (more than one person per workplace) is normally balanced by the provision of spaces and support services to cope with a more itinerant workforce.
- **Mean.** In describing the data set we frequently refer to the 'mean density'. To be clear, this refers to the weighted mean (i.e. the total area in question divided by the number of workplaces) rather than the simple mean (i.e. adding all the observations together and dividing the total by the number of observations).
- **Open-plan workspace.** This includes workstations, local storage associated with open-plan groups, local (open-plan) meeting facilities, and secondary circulation associated with these elements.
- **Primary circulation.** Those horizontal routes that are required for general movement of workers around office floors, and which must be maintained for safe evacuation of buildings during an emergency. Primary circulation includes enclosed corridors, and also routes through open-plan areas that are maintained to comply with means-of-escape requirements.
- **Support space.** This includes those shared spatial elements that accommodate facilities for an individual office floor (e.g. reprographics areas, meeting rooms, filing rooms) and those that are used by the whole organisation (e.g. reception areas, conference rooms, dining, stores, amenity facilities).
- **Work place.** The definition of a workplace is blurring as organisations introduce flexible working styles, along with facilities to support the needs of mobile workers, including shared desks, hot desks, drop-in desks and so on. The standard workplace accommodates a range of functions and is used to support employee work activities for sustained periods of time (>2 hours). This would normally include enclosed offices, dedicated workspaces and shared workspaces that meet health and safety or other recognised standards, i.e. Ergonomics of Human–System Interaction (BS EN ISO 9241). The standard workplace is the main unit of analysis in this report.