

Occupant survey (element 5)

Assessing the occupant's levels of satisfaction and perception of their control and comfort provides understanding in terms of how they use and interact with their environment. This can be undertaken through a number of methods, both one-off measurements and more long-term monitoring. Depending on objectives, occupancy survey methods can be alternative sources for collecting occupancy patterns and estimated operation of systems or even windows.

General note about timing: It is often recommended that when possible; administer questionnaires / surveys after a minimum of one year of occupancy. This ensures that occupants experience the full range of seasonal variation in the building.

Level 1: Occupant satisfaction survey: questionnaire

| | | |
|----------------|----------------|-------------------|
| Cost: ₹ | Time: ⌚ | Skills: 🙌🙌 |
|----------------|----------------|-------------------|

A self-completion questionnaire is a useful, yet relatively simple tool to gather quantitative data on the building and occupants. An occupant survey will reveal what people think and feel about the building, especially with respect to their needs. Interviews (level 2) can be used to follow on from questionnaires to explore topics that were emphasized by the respondents.

Potential tools needed:

- Prepared questionnaires
- Pen and paper
- Spot measuring tools for 'right now' surveys

How to formulate a survey:

- Keep questionnaires short: two A4 pages is good, more than three can be too long; causing boredom and disinterest.
- Ensure that questionnaires do not include leading questions ("Are you feeling uncomfortable?", which leads the respondent to think about discomfort). Instead ask questions like "How do you find the temperature in the afternoons in Summer?"
- Ensure there are indifference points, which allow the respondent to choose a neutral point on the scale: if they are neither too hot nor too cold then they should be able to tick a value of 4 (neutral) on a 7-point scale. The industry standard for this is to use odd-numbered scales, such as the 7-point Bedford Scale for comfort assessment.
- Give respondents lots of opportunities to comment but keep the comments short. If there is something important to them that you have missed out, they will soon tell you if they have the opportunity!
- Keep any additional questions to standard surveys as short and simple as possible and make sure that they follow the style and approach of the main questionnaire.

It can be produced in either paper or online form. Both formats have positives and limitations; an online survey has the added benefit of the answers being stored automatically (saving the researcher time in processing and managing the data) but do not often allow for additional (but relevant) comments to be made by the participant. Paper questionnaires also afford the researcher the potential to meet face-to-face with the participants (which is necessary for 'right-now' surveys).

Things to avoid:

- Technical terms which the respondent might not understand ("What do you think of the trickle ventilators?")
- Questions where the respondent might speculate an answer, such as what they might like or might need.



- Questions about things that you already know the answer to or can find out for yourself, such as “Is the building energy efficient?”
- Questions about 'importance' such as, "How important to you is the ventilation?", which might prompt a facetious answer like: "I will die if it is not there!". Ensure that the questions are meaningful to the respondents. If a respondent encounters a question which they think is meaningless or impossible to answer sensibly, they are likely to stop answering anything else.
- 'Forcing' respondents to tick answers when they might not want to. Give them a 'no response' option, or an "Other" box so that they can add other observations.

Designing and analysing the data gathered can be quite challenging and care must be taken to ensure that simple and understandable language is used. Visual tools within the questionnaire are often helpful to explain more technical or complicated questions. A pilot to demonstrate the length of time it takes, as well as to test the wording is recommended.

How to Conduct an Occupant Survey:

- Let respondents know what you are doing and why you are doing it. Explain how they might benefit from participating in the questionnaire.
- Ensure that the survey is conducted with the intention of making some improvements, as most people will expect that the results will inform some improvement to the conditions within the building.
- Ensure that the survey is being conducted by someone independent of the respondents management chain, (i.e., Don't have a line manager or housing manager distributing and collecting the survey, as respondents will be more likely to give the responses they feel are expected of them).
- Distribute the survey by hand, encourage respondents to ask questions, and give them a specific time when you will return to collect it. It's often best to return later the same day, or the following day.
- Ensure to note in any report the relevant context of when the survey was conducted. Issues such as a recent round of redundancies in an office, or construction work on an adjacent floor or building can affect people's responses and influence the results.

If a questionnaire is being sent out, without prior engagement with the subjects, a cover letter explaining the research and its aims is required, along with a return stamped and addressed envelope. In addition, a request for consent should be included as part of the questionnaires; either as a tick box on the questionnaire itself or as a separate consent form.

There are a few different types and methods of questionnaires given to occupants. Depending on the purpose of the study, a range of questions can be formulated. Some questionnaires used in previous Indian POE studies include:

- **Right-now or point-in-time surveys** are used to evaluate thermal sensations of occupants at a single point in time. Thermal comfort researchers have used these point-in-time surveys to correlate thermal comfort with environmental factors, such as those included in the PMV model: metabolic rate, clothing insulation, air temperature, radiant temperature, air speed, and humidity.¹ Studies by Indraganti, 2010²; Manu et al. 2016³ and Mishra & Ramgopal, 2014⁴ demonstrate a method for customizing the PMV model for the Indian context through the consideration of different clothing. See *ASHRAE 55 for an example*.

¹ A.S.H.R.A.E. Standard, 2010. Standard 55-2010:“Thermal Environmental Conditions for Human Occupancy”; ASHRAE. Atlanta USA.

² Indraganti, M., 2010. Using the adaptive model of thermal comfort for obtaining indoor neutral temperature: findings from a field study in Hyderabad, India. *Building and environment*, 45(3), pp.519-536.

³ Manu, S., Shukla, Y., Rawal, R., Thomas, L.E. and de Dear, R., 2016. Field studies of thermal comfort across multiple climate zones for the subcontinent: India Model for Adaptive Comfort (IMAC). *Building and Environment*, 98, pp.55-70.

⁴ Mishra, A.K. and Ramgopal, M., 2014. Thermal comfort in undergraduate laboratories—A field study in Kharagpur, India. *Building and environment*, 71, pp.223-232.



- **Occupant satisfaction surveys:** The basic premise of the satisfaction survey is that occupants by nature can recall instances or periods of thermal discomfort, identify patterns in building operation, and provide “overall” or “average” comfort votes on their environment. The surveyor may identify a span of time for the respondents to consider.¹ See *ASHRAE 55 for an example*.
- **Building Use Survey (BUS):** A BUS questionnaire is a self-completion questionnaire that is used throughout BPE and POE research studies and is licensed through Arup. It is an effective way of making quantitative assessments of qualitative factors. It is recommended that a questionnaire is sent to the occupants at least twice in one year (winter and summer). Due to the licensing, it is a requirement that the completed questionnaires are processed and analysed by Arup. This can be a more expensive option but, again, provides some analysis in return.

Common elements of an occupant survey can be categorised as:

- Background about the occupant
- Consideration of overall design
- Are needs met? (e.g. space/furniture to do the work that is required, storage availability, etc.)
- Space efficiency
- Safety
- Comfort
- Noise
- Lighting
- Productivity
- Health
- Control over the environment

Timing: timing of questionnaire distribution depends on the questionnaire. For seasonal thermal comfort studies, it is good to capture mid-season responses for right-now or point-in-time surveys. When timing the questionnaire so that occupants are experiencing the season in question is not possible (during short building studies), time of distribution is not restricted.

NEW BUILDING: A full 12 months after handover of a new building, once users have been in the building a full summer and winter season. In the case of a building that was just occupied, it is ideal to allow occupants to become accustomed to their environment before asking questions about their experience. However, there may be an interest in comparing results of initial perception and perception after the occupants have settled in.

Benefit: The survey will give an overview of the building’s performance from the users perspective, in the first year of occupation. This can aid the delivery and management team in fine-tuning the building controls to improve environmental conditions and energy performance, address shortfalls in performance, and better understanding how the building is being used by the occupants.

REFURBISHMENT or RETROFIT: Preceding a refurbishment or extension, where the same users will be occupying the building (In addition, after the refurbishment the ‘new building’ process can be followed.

Benefit: The survey will aid in identifying issues which are affecting occupants productivity and effectiveness, which can aid in managing a brief for a refurbishment or extension to ensure that the works benefit the end-users as much as possible and resolve issues which are important to them. It can also aid in gaining buy-in from occupants for conducting the works.

Potential barriers: Translating the questionnaires into a variety of languages, and not just English may need to be seriously considered, not only to increase the number of respondents but also to acknowledge the demographics of the study area.

