

SUPPORTING STATEMENT
U.S. Department of Commerce
National Institute of Standards and Technology
Evacuation Movement and Behavior Questionnaire
OMB CONTROL NO. 0693-0051

A. JUSTIFICATION

This is a revision/extension request for a currently approved information collection.

1. Explain the circumstances that make the collection of information necessary.

The Final Report on the collapse of the World Trade Center (WTC) Towers recommended that tall buildings be designed for timely full-building evacuations from both building-specific and large-scale events. Since the WTC study, project efforts were established within the NIST Engineering Laboratory (EL), formally the Building and Fire Research Laboratory, to better understand occupant egress from buildings. Our goal for this project is to improve occupant safety during building evacuations, and one critical way to achieve this goal is to conduct an information collection using the Evacuation Drills Questionnaire.

The data obtained from these questionnaires will help to better understand the performance of specific egress designs and provide guidance to codes and standards on the types of egress systems that are appropriate for tall buildings in the United States. Current egress systems, such as stairs, exit corridors and exit doors, are designed based on antiquated code requirements with little or no consideration for occupant movement and behavior, needs of emergency responders, or evolving technologies. Aggressive building designs, changing occupant demographics, and consumer demand for more efficient systems have forced egress designs beyond the traditional stairwell-based approaches, with little technical foundation for performance and economic trade-offs. There is a lack of evacuation data available to verify the level of safety provided by existing, as well as newly proposed code requirements for egress and access in buildings.

NIST would like to revise how the evacuation questionnaire is electronically distributed to respondents. See Question 3 below for details.

This data is necessary to improve current egress designs for buildings that will provide a higher level of safety for building occupants.

2. Explain how, by whom, how frequently, and for what purpose the information will be used. If the information collected will be disseminated to the public or used to support information that will be disseminated to the public, then explain how the collection complies with all applicable Information Quality Guidelines.

Data obtained from the questionnaire will be used by NIST/EL to improve code requirements and safety assessment models to make buildings safer for occupants. The trends on occupant movement and behavior during building evacuations will be used to support necessary code requirements and new code changes, improve safety assessment models that currently do not account for occupant behavior during an evacuation, and improve training and education for occupants in buildings. Also, general trends from this data will be provided to egress researchers around the world (via NIST reports and conference presentations) so that this data can be used to improve buildings world-wide.

It will be distributed to all building evacuees from a variety of buildings (e.g., 1-10 stories, 11-20 stories, 21-35 stories, and 35+ stories). The same questionnaire will be used for all buildings – specifically all of the same questions will be asked of all evacuees, and, for *each* specific building (which is unique in building design), the questionnaire will need to be modified slightly to accommodate for minor changes across buildings. However, since the opportunities for surveying building occupants usually become available with little notice, NIST is unlikely to have sufficient time for approval of each individual building questionnaire.

Therefore, the submitted questionnaire has been designed as flexible in that the response categories for some of the questions, listed below, will need to be modified with each building evacuation. First, due to the fact that each building design and make-up is unique, it is impossible to predict ahead of time the types of rooms located inside the building (Question 1), stair designations (Question 2), and exit designations (Question 3). Therefore, the submitted questionnaire is structured so that the three questions below have flexible response categories that can be altered with each building surveyed. Across all buildings, none of the actual *questions* will change.

Question 1: Asks the occupant at which location he/she was when the evacuation drill began. This question will remain the same for all buildings, however, depending upon the building type, there are several different rooms that can be suggested as response categories. Examples of these are shown here. Rooms in an office building can be very different from rooms located in a residential or dormitory building. This question’s response categories will need to be flexible to account for these changes across different buildings, therefore, response options may change depending upon the type of building.

Where were you when you first became alerted to the incident in this building? (*To be tailored to rooms in involved building*)

- | | | | |
|--|-----------------------------------|--|---|
| <input type="checkbox"/> Your own office/room | <input type="checkbox"/> Restroom | <input type="checkbox"/> Cafeteria | <input type="checkbox"/> Stairwell |
| <input type="checkbox"/> Colleague’s office/room | <input type="checkbox"/> Elevator | <input type="checkbox"/> Basement | <input type="checkbox"/> Storage / copy area |
| <input type="checkbox"/> Meeting room | <input type="checkbox"/> Corridor | <input type="checkbox"/> First floor lobby | <input type="checkbox"/> Other, specify _____ |

Questions 2 and 3: These questions ask the occupant which stairwell did he/she use and which exit did he/she use to evacuate the building. Again, these questions will remain the same for all buildings surveyed; however, depending upon the stair and exit labels used by the building, the response categories will need to reflect each building separately. For example, stairs can be labeled as East/West, North/South, A/B/C, and/or 1/2/3, etc. Response categories in question #2 will need to reflect the stair designations for each stairway inside the building – and there may be more than 2 stairs per building. Similarly in question #3, exits can also be labeled differently in each building, so the questionnaire should be developed as flexible to account for various exit labels.

2) Question in Section 3: If you left by a stairwell, did you use... Stair ___ Stair ___

3) Question in Section 3: If you exited the building, which exit did you use?

- | | |
|---|-----------------------------------|
| <input type="checkbox"/> Exit ___ | <input type="checkbox"/> Exit ___ |
| <input type="checkbox"/> Exit ___ | <input type="checkbox"/> Exit ___ |
| <input type="checkbox"/> Exit ___ | <input type="checkbox"/> Exit ___ |
| <input type="checkbox"/> Other _____ (please specify) | |

Finally, depending upon the incident, the three questions listed, may require response options to be removed. Currently, the questionnaire includes response options for situations in which a real fire occurred. In most cases, however, it is likely that occupants will receive this questionnaire after participating in an evacuation drill, in which case, all response options pertaining to a real fire incident will be removed. The three examples of such questions are provided below, and the response options pertaining to an actual fire incident are marked out (with ~~strikeout~~ font) to show which options would be removed. As mentioned earlier, across all buildings, none of the actual *questions* will change.

How did you first become alerted to the incident? Mark all that apply.

- Alarm tone
- Voice alarm message to evacuate
- Voice alarm message to wait on floor/remain on floor
- Flashing strobe light
- Manager of company/Boss
- Evacuation coordinator/fire warden/fire safety staff for building
- Colleague/coworker
- ~~Smoke (dark/dense) OR Smoke (light/diluted)~~
- ~~Flames/fire~~
- Fire department personnel or equipment/trucks
- Other, please specify _____.

If you left by a stairwell,

(a) Did you use... Stairwell ___ Stairwell ___

(b) Please check any of the conditions you encountered during the evacuation:

- Furniture or other object(s) obstructed entry to stairwell.
- Crowding in the stairwell.

- Difficulty opening stairwell or exit doors (Which doors? _____).
- Uncomfortable handrails.
- Poor lighting.
- Emergency responders/other people were coming up stairwell.
- People in front of you were moving too slowly.
- People were standing /resting on the landings.
- Confusion with which way to proceed.
- Shoes were uncomfortable for the required distance.
- ~~Smoke (Where did you encounter smoke? _____).~~
- Other, please specify _____.

(12*c) And, what caused this change? Please mark all that apply.

- ~~Smelled smoke.~~
- The stair was blocked (How? _____).
- Crowding in the stairwell.
- Thought another way would be quicker.
- Instructed to do so
By Who? _____
What were the instructions? _____
- Followed other people.
- Forgot something (What? _____).
- Other _____

Even though statistical sampling methods are not being used, NIST is interested in performing simple statistical analyses on the data to determine inter- and intra-building similarities and differences. NIST may use basic analysis techniques such as simple difference of means tests and basic regression analysis.

3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological techniques or other forms of information technology.

In some buildings that will use the questionnaire, the building management may prefer to email the questionnaire to their employees. As is, the questionnaire is not constructed properly to allow for electronic completion and if a respondent would attempt this, his/her responses would reformat the spacing of the questionnaire, making it harder to read and fill-out. Therefore, EL would like to make two changes to the previous paper-version of the questionnaire:

1. Add electronic check boxes and text fields so that the questionnaire can be filled out electronically (in Microsoft Word on respondents' computers).
2. Provide the option of an online questionnaire using a website, such as Survey Monkey, to allow respondents to respond online. If this is done, the building manager will host the website and after responses are provided, they will send the questionnaire results to NIST/EL, so that the occupant responses will remain anonymous to NIST/EL.

The reasons for requesting additional distribution options is because people are moving more and more into the use of electronic media to communicate, and several of the building managers NIST/EL has worked with recently have requested the option to distribute the questionnaire via electronic means, including email and online sites.

4. Describe efforts to identify duplication.

For the most part, there will be no duplication. It is possible that NIST will collect evacuation data more than once from the same building (e.g., many buildings run evacuation drills annually and may ask NIST to return to collect a second round of questionnaire data from the occupants). Duplication is important in order to understand uncertainty in our data collection as well as to understand improvements in evacuation procedure as a result of building-wide training and education. The questionnaire is always voluntary and if an occupant does not want to participate, he/she is not forced to do so.

5. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

NIST may receive questionnaire responses from occupants of small businesses. Any burden to the small business is minimized by the fact that responses to this questionnaire are voluntary.

6. Describe the consequences to the Federal program or policy activities if the collection is not conducted or is conducted less frequently.

If NIST did not conduct this research, building owners, code officials, engineers, and the American public still would not understand the appropriate and necessary egress designs to install in current buildings, especially taller buildings. This may result in egress designs that overestimate the needs of the population and building (resulting in higher costs of the building) or underestimate the needs the population and building (resulting in a lower level of safety for building occupants evacuating during fires).

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

There are no special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

8. Provide a copy of the PRA Federal Register notice that solicited public comments on the information collection prior to this submission. Summarize the public comments received in response to that notice and describe the actions taken by the agency in response to those comments. Describe the efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported.

A Federal Register Notice soliciting public comments was published on July 20, 2011 (Vol. 76, No. 139, pages page, 43265). One comment was received from Robert Solomon, National Fire Protection Association (NFPA) who directly contacted EL and asked to be provided with a copy of the questionnaire. A copy of the questionnaire was emailed to him for his review. Mr. Solomon submitted his comments to OMB and they were received by NIST on September 20, 2011.

The comments and responses are provided below.

COMMENT 1:

An overall comment is that this survey is trying to be too many things at once. It occasionally reads as though the hope is to be able to use it following drills OR fires, in offices OR residential buildings, but most of the questions relate to office buildings. It is cleaner to have separate, slightly variant, questionnaires for each use. If it's easier to get OMB approval for a single survey, then show the various wording options for the questions, depending on the use of the questionnaire. The modifications would be made for each specific event.

RESPONSE:

Yes, this is true that the questionnaire has been developed for a variety of different building types and emergency conditions (e.g., evacuation drills and an actual fire event). However, each time the questionnaire is used, NIST has permission to alter certain questions and response options to best reflect the situation. So, for example, in evacuation drills, NIST is able to remove all response options that pertain to actual fire events so as to not confuse survey respondents and to tailor the questionnaire to meet the purpose of the study.

COMMENT 2:

Section 1 instructions –

- (1) be very cautious providing examples, as they tend to plant ideas and/or direct lines of thinking. Using 'from the initial alarm' may preclude someone from thinking of a verbal warning (or some other queue) as being a relevant alert for this project.

RESPONSE:

While I agree with the comment to avoid swaying individuals with examples, it is important to be as clear as possible in mail or paper questionnaires since an interviewer is not present to clarify any confusion. The time period of alert is a potentially confusing period for some individuals and since the very first question in the questionnaire discusses how they were first alerted, NIST thinks that it is appropriate to include a simple example in the instructions for Section 1.

COMMENT 3:

(2) suggest using a word like ‘event’ rather than ‘incident’ to make the survey more versatile.
Who would think of an annual fire drill as an ‘incident?’

Question 2 – same comment as above on use of the word ‘incident’

RESPONSE: NIST will consider this change and make a final decision later.

COMMENT 4:

Question 3b – Since this survey seems to be largely aimed at office building evacuations, the example ‘working’ is very general. Keeping in mind the concern about providing any examples, you still might want to give less specific examples. The work a person is engaged in can affect their ability or willingness to break free to respond to an alarm. More specific examples would include being on the phone, on the computer, reading, in a meeting, eating, etc.

RESPONSE:

NIST has the flexibility to alter this example; will consider this change and make a final decision.

COMMENT 5:

Question 5 – Instructions and information are not the same thing. You ask about both, but then use each word separately later. Suggest rewording ‘After initial alert, did you receive any additional instructions/information from any of the following while you were on *that* floor? If yes, number all that apply in the order that you received *them*, beginning with (1). If necessary, you can number the same source of *information* more than once.’ (Also suggested here is changing ‘on *the* floor’ to ‘on *that* floor,’ both for readability and to be more specific that you’re referring to the floor where the person started.)

RESPONSE:

NIST made this change.

COMMENT 6:

Question 5 choice – delete ‘for building’ from the Floor Warden choice. Floor wardens are generally for the floor, not the building.

RESPONSE:

NIST has made this change.

COMMENT 7:

Question 6-

(1) You have an option for seeking information, but you don’t ask what information was sought, only what was found. That’s not the same thing. In order to provide useful information for evacuation planning, it’s important to find out what people feel they need (what they seek). Asking about what they found is a separate question, if you’re interested in that.

(2) ‘Looked for others in the building’ – this isn’t what you mean. This section of the survey is for activities while still on the floor where the person started. They will not be looking for others in the building at that point, especially if you mean physically searching for anyone. You mean ‘Look around for others or look around for other occupants [on that floor]’ Other actions such as notifying others in or outside of the building via phone or text message or email might also be an action that was carried out.

RESPONSE:

- (1) Changed subsequent question to “What information did you seek?”
- (2) Changed to “Looked for others on the floor.”

COMMENT 8:

Question 7a – ‘on *that* floor’ or ‘on *your* floor,’ not ‘on *the* floor.’ (Sounds like people are lying on the floor.) In this section of the survey, people can be moving from their initial location to the exit access. How are they supposed to interpret this question? Are you asking about people around them initially or anyone they see at any point as they make their way to the stairwell/exit? How are you going to interpret the result, when you don’t know what point in time/space they’re referring to?

RESPONSE:

This question will be left as is and is simply asking if there are others around the person on their floor. Ideally, it would be nice to separate out asking about people initially and then people on the way to the stairs, and then people at the stairs, but this makes the questionnaire a bit too complicated in its current form.

COMMENT 9:

Question 10 – suggest changing ‘incident’ to ‘event’ unless you’re using this question after an emergency incident only.

RESPONSE:

We will consider this change and make a final decision later.

COMMENT 10:

Question 12 –

- (1) why are there two 12a and 12b questions? The “*” mark is a subtle distinction but not sure why not just label it as (c), (d), (e).
- (2) In 12*a, you ask about transfer hallways. How often is that something that has to be addressed in a high-rise evacuation? Shouldn’t this be something that’s only asked when it’s relevant?
- (3) Disparity between 12*a and 12*c – 12*a asks about *leaving* the stairwell but then 12*c asks about *changing* stairwells. These are not the same things. Changing stairwells would be one of the reasons for leaving the stairwell, but far from the only one. You also don’t include reasons for leaving the stairwell such as to rest, to get water, to use the restrooms, etc. (various reasons given by people during the WTC evacuations).
- (4) editorial point – it should be ‘By whom?’

RESPONSE:

Again, NIST has the flexibility to delete text and response options that are not relevant to the building or situation.

-Additionally, 12*c was changed to read as follows: “(12*c) **And, what caused you to leave the stairwell? Please mark all that apply.**”

-Finally an “other” category is provided allowing for individuals to add additional reasons why they left the stairwell.

COMMENT 11:

Question 13b – This is not a simple yes/no question. The people in the stairwell can also be a combination of people from that floor and people who were already in the stairwell or came in on lower floors. How is a respondent supposed to handle that answer? More importantly, what is the purpose of this question? How will you use this information? Obviously, some merge/precedence behavior would have occurred if there are people in the stairs from other floors, but you don’t get any information about that behavior, or how many people may have had to merge at the subject’s entry point or lower, or even how crowded the stairwell was at any merge point. And, what do you mean by ‘same people’ – same as what?

RESPONSE:

Here, we are simply asking if occupants evacuated with individuals from their floor or not (did they leave together?). NIST will leave the question as is.

COMMENT 12:

Question 15a – As written, this question can be interpreted as asking about information received *prior to the event* concerning what to do in the stairwell or elevator. The question must start out with ‘While you were in the stairwell/elevator,....’ if you want to be clear that you mean during the event.

RESPONSE:

The change was made.

COMMENT 13:

Question 15b – This question should follow the same format as Question 5 – information and instruction are not the same thing.

RESPONSE:

The change was made.

COMMENT 14:

Question 19 – This is an example of the questionnaire trying to do too many things. Everything up to this point is more relevant to an office building than a residential high-rise. Separate versions of the survey for each type of event would be cleaner. Also, is there any plan to use this survey for a hotel evacuation? This question wouldn’t work on such an event.

RESPONSE:

Please see response to comment 1 above about NIST’s ability to alter the response options and questions to correspond to the building and building condition.

COMMENT 15:

Question 24c – This list of choices is a bit dated. It doesn’t include an option for cohabitating unmarried partners, for example, or civil union or domestic partnership – whatever you want to call it.

RESPONSE:

NIST has added “Living with Partner” as an option.

COMMENT 16:

Question 24d – I’m not sure why you ask this question, but isn’t it usually asking about children under 18 living with you at home? Or do you just want to know that a person has children?

RESPONSE:

NIST is interested in if the individual has children under 18 for which he/she may need to care for.

COMMENT 17:

Missing info:

You don’t ask about disabilities. Question 17 asks about conditions that might have made an evacuation more difficult. Question 11b gives a person who used an elevator the opportunity to mention that they have a ‘condition’ (but you won’t know what it was). In the end, you will not know how many of the evacuees have any disability, because you don’t ask.

RESPONSE:

Mobility, hearing and visual impairments are asked about in Question 17.

9. Explain any decisions to provide payments or gifts to respondents, other than remuneration of contractors or grantees.

There are no payments or gifts to respondents.

10. Describe any assurance of confidentiality provided to respondents and the basis for assurance in statute, regulation, or agency policy.

The assurance of confidentiality is not given to respondents because these are anonymous surveys. Also, the questionnaire does not contain any questions that would reveal the identity of the respondents.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private.

Not Applicable.

12. Provide an estimate in hours of the burden of the collection of information.

It is estimated that 20,000 respondents will complete the questionnaire annually and it is estimated it will take 10 minutes. The estimated total annual burden hours will be **3,333**.

13. Provide an estimate of the total annual cost burden to the respondents or record-keepers resulting from the collection (excluding the value of the burden hours in Question 12 above).

Not Applicable.

14. Provide estimates of annualized cost to the Federal government.

Since the questionnaires will be likely distributed via email or online, there are negligible supply costs associated with this project. However, NIST will review and analyze the data in order to compose a report (or multiple reports). The estimated Federal government cost is \$40,000 to review, analyze results and compose the report.

15. Explain the reasons for any program changes or adjustments.

The proposed revisions (program change) for electronic submission of the questionnaire are not expected to change the estimated burden per response but NIST expects an increase in respondents/responses of 13,334; and corresponding burden hour increase of 2,222.

16. For collections whose results will be published, outline the plans for tabulation and publication.

The results of the questionnaires will be analyzed in order to identify trends in common behaviors and actions, analyze the performance of the egress system, and other relevant conclusions. More specifically, we are interested in the impact of occupant demographics, previous education and training, previous experience in fire evacuations, and awareness of the event on the *reported* decisions made and the actions performed by occupants 1) on his/her floor during the building evacuation and 2) while in the stairwell and/or the elevator during

evacuation. The results will be published as NIST technical reports. No specific quotes or individual responses from this information collection will be included in these reports.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons why display would be inappropriate.

Not Applicable.

18. Explain each exception to the certification statement.

None.