INFORMATION COLLECTION
SUPPORTING STATEMENT
TRACK INSPECTION TIME STUDY
FRA Form Numbers F 6180.136; F 6180.137; F6180.140; F6180.141; F6180.142; F6180.143

Part B: Collections of Information Employing Statistical Methods

1.   **DESCRIBE (INCLUDING A NUMERICAL ESTIMATE) THE POTENTIAL RESPONDENT UNIVERSE AND ANY SAMPLING OR OTHER RESPONDENT SELECTION METHODS TO BE USED. DATA ON THE NUMBER OF ENTITIES (E.G., ESTABLISHMENTS, STATE AND LOCAL GOVERNMENT UNITS, HOUSEHOLDS, OR PERSON) IN THE CORRESPONDING SAMPLE ARE TO BE PROVIDED IN TABULAR FORM FOR THE UNIVERSE AS A WHOLE AND FOR EACH OF THE STRATA IN THE PROPOSED SAMPLE. INDICATE EXPECTED RESPONSE RATES FOR THE COLLECTION AS A WHOLE. IF THE COLLECTION HAD BEEN CONDUCTED PREVIOUSLY, INCLUDE THE ACTUAL RESPONSE RATE ACHIEVED DURING THE LAST COLLECTION.**

The potential respondent universe for the track inspector survey is the 2,500 railroad track inspectors in the United States who are members of the Brotherhood of Maintenance of Way Employes (BMWED). Inspectors at Norfolk Southern, a Class I railroad, are not represented by a labor organization, so reaching this group is not feasible. Privacy concerns prevent an employer from providing names and addresses of their employees to FRA's contractor, TSG. The BMWED has agreed to assist FRA in contacting its members to participate in the study. For its own purposes, in spring of 2009, the BMWED identified those among its membership who are actively working track inspectors. BMWED will make this list available as the sampling frame for the track inspector survey. Respondents will be selected randomly from this sampling frame.

This collection has not been conducted previously, so the response rate must be estimated from other similar efforts. As described in more detail in item number three (3) below, the expected response rate is 31 percent. (*Note: In the previously approved survey study of Maintenance of Way Employees (OMB No. 2130-0561), the response rate was 31 percent.*)

Interviews will be conducted with a total of 25 track supervisors/roadmasters from the following:

Organization	Number of interviewees
5 Class I US railroads	15
2 Class I Canadian railroads	4
Amtrak	3
Short Line/Regional railroads	3

This group will be a convenience sample based on recommendations from the employing railroad. Each supervisor must have at least one year of experience in the position.

In addition, interviews will be conducted with the following individuals:

Position	Number of interviewees	Selection criteria
Division Engineers	8	1 from each Class 1 railroad plus Amtrak
System Level Officers	8	1 from each Class 1 railroad plus Amtrak
BMWED General Chairmen	5	Recommendation from BMWED; must have track inspection experience
BMWED Dir. Education & Safety	1	One person holds this position

FRA determined that these individuals will provide the range of track inspection experience that is necessary to respond to the requirements of the RSIA.

2. DESCRIBE THE PROCEDURES FOR THE COLLECTION OF INFORMATION INCLUDING:

- **STATISTICAL METHODOLOGY FOR STRATIFICATION AND SAMPLE SELECTION**

- **ESTIMATION PROCEDURE**

- **DEGREE OF ACCURACY NEEDED FOR THE PURPOSE DESCRIBED IN THE JUSTIFICATION**

- **UNUSUAL PROBLEMS REQUIRING SPECIALIZED SAMPLING PROCEDURES, AND**

- **ANY USE OF PERIODIC (LESS FREQUENT THAN ANNUAL) DATA COLLECTION CYCLES TO REDUCE BURDEN.**

One of the most important issues in conducting this study is determining how large a sample is necessary for the estimates obtained in the sample survey to be reliable enough to meet the objectives of the study. In general, the larger the sample, the greater the reliability of the resulting estimates, but this must be traded off against the expense of a larger sample. The first step in this process is to specify the level of reliability needed for the resulting estimates.

The purpose of this study is to obtain descriptive information about the track inspection process. FRA assumes that 95 percent confidence is adequate for this purpose. In addition, we assume our estimate should be within 7.5 percent of the "true" value. One statistic of interest is the estimated distance traveled on daily inspections. Assuming that we will be able to sample from the actively working BMWED membership only, there are approximately 2,500 track inspectors. The appropriate sample size, *n*, for estimating the mean estimated distance traveled can be computed from the following (Levy & Lemeshow):

$$n \geq \frac{(z^2 N V_x^2)}{z^2 V_x^2 + (N - 1)\varepsilon^2}$$

where z = reliability coefficient (1.96 for 95 percent confidence level)
N = population size
V_x = unknown population variance
ε = error tolerance

This estimation for sample size applies as well to other mean values, such as inspection time, that the study seeks to estimate.

Based on a summary of estimated distance studies provided by Boff and Lincoln (1988, pp. 896-897), it can be estimated that the population variance is 1.18. Applying this estimate of V_x, variance to the track inspector population (N=2,500) and using an ε = .15, the sample size should be 217.

A simple random sample will be selected from the sampling frame described in item 1 above. FRA will use sampling without replacement. Each candidate track inspector will be assigned a number sequentially from 1 to the total number of candidates, C. Using an integer random number generator, numbers in the range 1 to C will be drawn until the desired number is reached. (*See* item number 3 for discussion of target number of names to be drawn.) In the event of a duplicate number, another will be drawn.

FRA plans to limit the analysis of this data to characterizing all railroad track inspection activity. No attempt will be made to establish subgroups based on demographic factors such as age or years of work experience or individual railroad. Comparisons will, however, be drawn between inspections done via hi-rail versus those done on foot.

The budget available for this study will not allow for a larger sample size. The error level chosen is consistent with the known variance of distance estimates in the general population (Boff & Lincoln, 1988).

References

Levy, P., & Lemeshow, S. (1999). *Sampling of Populations: Methods and Applications.* New York: John Wiley & Sons, Inc.
Boff, K. R., & Lincoln, J. E. (1988). *Engineering Compendium. Human Perception and Performance*. Wright-Paterson Air Force Base, Ohio: Harry G. Armstrong Aerospace Medical Research Laboratory.

3. **DESCRIBE METHODS TO MAXIMIZE RESPONSE RATES AND TO DEAL WITH ISSUES OF NON-RESPONSE. THE ACCURACY AND RELIABILITY OF INFORMATION COLLECTED MUST BE SHOWN TO BE ADEQUATE FOR INTENDED USES. FOR COLLECTIONS BASES ON SAMPLING, A SPECIAL JUSTIFICATION MUST BE PROVIDED FOR ANY COLLECTION THAT WILL NOT YIELD "RELIABLE" DATA THAT CAN BE GENERALIZED TO THE UNIVERSE STUDIED.**

Since not every track inspector who is selected to participate in this study will choose to do so, over sampling is necessary. The extent of over sampling is a function of the anticipated response rate. Conservatively, the planned study can likely achieve at least a 31 percent response rate. (As mentioned previously, this estimate for the likely response rate is based on the response rates of the recently completed maintenance of way worker fatigue survey, which had a response rate of 31 percent.). If 31 percent of the selected individuals in the random sample choose to participate in the study, then the random sample must be 700 (217/0.31) to yield 217 participants.

Due to the nature of the railroad industry, FRA doubts that the response rate for this survey will achieve what is possible with other non-railroad populations. Based on experience with other FRA research efforts that sought participation from railroad workers, FRA researchers have found that many of these workers are suspicious of any efforts to collect data, even if the effort has the endorsement of their labor union and the researchers assure the confidentiality of the information.

The FRA study plan includes several specific actions designed to encourage participation in the track inspector survey. These actions are based on the Total Design Method, a standard set of mail procedures designed to maximize response rate (Dillman, 1983), and include the following:

- The survey materials will be sent via first class mail with a personally addressed and dated letter printed on high quality paper. The package will contain a cover letter, track inspector survey, and a first class postage paid envelope for return of the survey. (Copies of the cover letter and survey instrument accompany this justification.)

- Two weeks after distribution of the materials, a follow-up reminder postcard will be sent to all recipients who have not returned their survey and who have not indicated that they do not wish to participate. (Text for this postcard provided as postcard.doc)

- The background questionnaire is 8.5 x 11 in., printed on white paper with no questions on the cover page. The cover page contains only the title "Track Inspector Survey," the FRA form number, the OMB control number, and the participant's i.d. number. The required OMB statement, including the assigned OMB Control number and the confidentiality assurance statement, is on the inside of the cover page of the survey. The survey instrument is designed to be visually pleasing and easy to read.

- The survey cover letter is from the FRA Administrator. In addition to explaining the survey procedure, this letter describes the benefits of the study to track inspectors and encourages individuals to participate in the study. This letter, as well as an article

that will appear in the BMWED Newsletter prior to the survey, are intended to familiarize BMWED members with the effort and to legitimize the study.

In the event that the response rate is below 75 percent, FRA plans to conduct a non-response bias study. From the BMWED membership databases, it is possible to determine the age of each member. The number of years of experience as a track inspector is not available in the membership database. The non-response bias study will involve comparing the age distribution of the survey non-respondents with the age distribution of the respondents. Age is an important characteristic for assessing potential bias, because age is highly correlated with years of work experience and seniority. The mean age for each group will be compared.

Since railroads will recommend specific track supervisors for the phone interviews, FRA expects the response rate for the phone interviews to be close to 100%. If when contacted, one of the individuals is unable to participate, FRA's contractor will ask the employing railroad for another candidate. FRA and its contractor are in contact with the Association of American Railroads and the American Short Line and Regional Railroad Association regarding this study. Both organizations have agreed to contact their members regarding the study and to assist the contractor in obtaining the names of individuals who are willing to participate in an interview. The contractor will provide the interview questions in advance of the interview so that the interviewee may assemble any required data and will have an opportunity to consider the open-ended questions that are part of the interview protocol. This should improve both the response rate and the quality of the responses.

References

Dillman, D. (1983). Mail and Other Self-Administered Questionnaires. In Rossi, P, Wright, J, and Anderson, A.(eds.) *Handbook of Survey Research.* Orlando: Academic Press, Inc.

4. **DESCRIBE ANY TESTS FOR PROCEDURES OR METHODS TO BE UNDERTAKEN. TESTING IS ENCOURAGED AS AN EFFECTIVE MEANS OF REFINING COLLECTIONS OF INFORMATION TO MINIMIZE BURDEN AND IMPROVE UTILITY. TESTS MUST BE APPROVED IF THEY CALL FOR ANSWERS TO IDENTICAL QUESTIONS FROM 10 OR MORE RESPONDENTS. A PROPOSED TEST OR SET OF TESTS MAY BE SUBMITTED FOR APPROVAL SEPARATELY OR IN COMBINATION WITH THE MAIN COLLECTION OF INFORMATION.**

A focus group with six participants, all actively working track inspectors from three railroads, was conducted on August 18, 2009 to refine the survey procedure and instrument. The survey instrument accompanying this application reflects the improvements suggested through the focus group discussion.

5. **PROVIDE THE NAME AND TELEPHONE NUMBER OF INDIVIDUALS CONSULTED ON STATISTICAL ASPECTS OF THE DESIGN AND THE NAME**

OF THE AGENCY UNIT, CONTRACTOR(S), GRANTEES, OR OTHER PERSONS(S) WHO WILL ACTUALLY COLLECT AND/OR ANALYZE THE INFORMATION FOR THE AGENCY.

FRA has engaged the services of QinetiQ North America Technology Solutions Group (TSG), 350 Second Ave., Waltham, MA 02451, for the conduct of this study. TSG will be responsible for data collection, information coding, and analysis.

The TSG primary point of contact for this work is:

> Judith Gertler
> (781) 684-4270
> judy.gertler@qinetiq-na.com