

# QUESTIONNAIRE RESEARCH IN THE CENSUS OF CONSTRUCTION INDUSTRIES

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Research on the Census of Construction Industries questionnaire represents the Bureau's first attempt to conduct research on the design of economic census forms. The goal of this research was to develop guidelines for improving the Census of Construction Industries forms. This paper describes both the methods that we used and some research results. Initially, we conducted a preliminary forms appraisal and cognitive interviews with respondents. Following this, we designed four alternative forms and conducted a test of these forms. In this paper, we limit the discussion to selected items from two of the newly-designed forms.

## **METHODOLOGY**

### **Forms Appraisal and Cognitive Interviews**

We began a systematic review of the Census of Construction Industries questionnaires in 1989. We first conducted a preliminary forms appraisal in which we used intuition and experience to uncover potential problems in the questionnaires, to identify items that needed to be examined in depth, and to develop probing questions. Also, we reviewed completed forms from the 1987 census during this stage of the process.

Following this, we conducted ten cognitive interviews with respondents from single- and multi-unit establishments. The Census of Construction Industries collects data at the establishment level. An establishment is a relatively permanent office, or place of business, where the usual business activities related to construction are conducted. Companies with more than one establishment (multi-units) must complete reports for each of their establishments. The respondents to the cognitive interviews were employees of local establishments (electrical, building, and nonbuilding contractors) who agreed to participate in the study. Respondents generally needed to consult company records and other employees to answer the questions on the form. We included multi-establishments to see if respondents completing multiple forms had any special problems due to their corporate structures or recordkeeping systems.

We used the "think-aloud" technique to conduct the interviews: respondents read aloud as they read through the form, and thought aloud as they answered questions. Since respondents needed to access company records to complete the forms, interviews took place at the establishment's site. The Bureau officially estimates that it takes 45 minutes to complete the form. While it is reasonable that the "think aloud approach" would extend the time some, the 45-minute estimate seems to be a severe underestimate. It took respondents who used their records from 1-1/2 to 3-1/2 hours to complete the form, and respondents who did not use their records generally took 1-1/2 hours. All our respondents had previous experience completing the form in a census. They knew it would take longer to complete the form if they used records, and this no doubt hampered our ability to get them to do so. Only three of the ten respondents actually completed the form using their records. Respondents who refused to use records still went through the form. They read the questions aloud and explained how they would go about answering them. They were probed for their understanding of the questions, and while their sessions did not yield as much information as the ones in which records were used, they did provide useful data which was similar to that of the record-users in many respects.

### **Form Revision and Field Testing**

The next step was to draft a revised version of the form. In a cooperative effort with subject matter staff, we revised the initial

draft and developed three additional versions. In this paper, we discuss only the control version and two of the revised versions: Panels 1, 2, and 3.

Panel 1 is the 1987 version of the form. It contains the original layout, wording, and sequencing of questions on the front and back of two sheets of 8-1/2 by 14 inch paper. A list of business activities and instructions accompany the form, each on a separate sheet of paper. This panel serves as the control panel against which Panels 2 and 3 can be compared.

Panel 2 is a 12-page standard size booklet (8-1/2 by 11 inches) containing changes to both the layout and wording of the items. It should be noted that the number of pages increased notably in the new format. One obvious reason for this is the reduction in page size. A second reason is that the business activity list, which was a separate sheet in Panel 1, was part of the booklet of Panel 2. Another reason is that a cover page was added to this version and a few of the items were expanded. Thus, in comparison to Panel 1, this panel contains two major changes: (1) the number of pages increased from 4 to 12; and (2) the layout and wording of the items changed.

Panel 3 is the same as Panel 2 except for its sequence. Panel 2 begins with questions related to the mailing label, and the establishment's operational and organizational status. These are followed by questions concerning payroll and costs. It is not until late in the questionnaire, Item 15, that the respondent comes upon questions relating specifically to construction. The revised sequence, on the other hand, begins with information more directly related to construction. Items were rearranged so that questions concerning receipts come first, followed by costs, then assets.

A field test of the newly-designed forms was then conducted. It was designed to follow actual census procedures as closely as possible, so the results of this test would be generalizable to future censuses. The sample for the test, which included five panels rather than just the three discussed here, consisted of about 6,000 establishments selected from the 1987 census of construction mailing list. The sample for the three panels described above included about 3,600 establishments. It was a stratified sample, containing single- and multi-unit establishments from three construction industries: building, nonbuilding, and special trade contractors not elsewhere classified. The building industry was chosen because it is one of the most economically important construction industries and because it had the highest nonresponse rate in the 1987 census. The nonbuilding and special trade industries were chosen because of their diversity, which would test the forms with a wide variety of companies.

Equal numbers of forms were mailed for each of the questionnaire-by-panel-by-industry combinations at the end of August 1990. Along with the form, the mailing package contained an evaluation supplement that asked about respondent's reactions to the form, problems in completing the form, and how long it took to complete the form. A follow-up mailing was sent to nonrespondents in early October. The overall response rate to the test was 57.8 percent. This compares favorably with the response rate from the 1987 census for the three industries included in the test, which was 55 percent.<sup>1</sup> Approximately two-thirds of the respondents who returned a usable form also returned an evaluation supplement. Analyses of the data were restricted to establishments that indicated they were in operation during some part of 1989, the year for which data were collected. Some analyses were further

restricted to certain subpopulations, such as establishments with valid industry codes, depending upon the purpose of the analysis.

We used the data from both the forms and the evaluation supplements to assess the newly-designed questionnaires. Nonresponse and partial response rates, administrative checks, and comparison of responses across panels were determined from the questionnaire data. Item nonresponse is defined as lack of response to a question. Partial response is defined as response to one or more parts of an item, but not response to all subparts. To see if respondents report differently across panels, means of the reported values are compared. Before calculating the means, data reported incorrectly in dollars were converted to dollars-in-thousands to eliminate possible confounding effects due to errors in respondent reports. Finally, the results of the evaluation supplement are examined as they relate to the items being examined. To the extent that respondents who returned an evaluation supplement differ from those who did not, we note that results of the evaluation supplement may be subject to an unknown degree of response bias.

## **RESULTS**

The number of employees item and the total dollar value of business item are used to illustrate the kinds of problems that were uncovered as a result of the appraisal and cognitive interviews (see DeMaio and Jenkins, 1989, for a complete summary of these problems). Next, they are used to demonstrate the kinds of revisions made to the original version of the form and to discuss the results of the field test (see DeMaio and Jenkins, 1991, for preliminary results concerning all of the items on the forms).

### **Number of Employees**

The number of employees item is shown in Figure 1. In the original version of the form, this item comes near the bottom of the first page. It, like all the items on the form, begins with a brief boldfaced heading meant to quickly convey the nature of the item. The heading is followed by a more specific question and a paragraph that explains who should be included in the counts. Respondents are to report the number of construction workers, other employees, and the total number of employees separately in parts a, b, and c, respectively. A list of examples is provided to help respondents in this task.

The cognitive interviews uncovered a number of problems with this item. First, they revealed that several respondents misunderstood the time period being referenced. After reading the heading and sometimes, the question that follows the heading, they would turn their attention to the answer boxes at the right. At this point, their eyes were drawn to the column headings rather than the header that spans the headings, and as a result, they overlooked essential information. The header reads "Number of employees of this establishment during the pay period including the 12th of--," and since "pay period" is not mentioned in either the item heading or the question, several respondents thought the item referred to monthly or quarterly time periods rather than to the four specific pay periods listed. This led to the systematic overreporting of data on the part of several respondents.

Another problem was that respondents tended to ignore the instructions in the paragraph that follows the question. They did not seem to think the instructions were necessary, especially given how long they appeared to be. They did, however, read the list of examples quite thoroughly.

The revised version of the number of employees item is shown in Figure 2. In the new version, the item heading was replaced with a bold-faced, comprehensive question, to eliminate the confusion that arose with the heading and to make the question the main thrust of each item. Bold-faced type was used to convey the importance of the question and to serve as a kind of road map for other questions that have a leading phrase followed by several parts

that are interrupted with other information, such as a list of examples. The lists and other instructions were put in light-faced type. This was the main variation used in the type faces.

The pay period header that had been overlooked by respondents in our cognitive interviews was made the leading phrase in the question of Panel 2. The time periods were repeated in each column heading to ensure that respondents would understand the time period being referenced. Because respondents often omitted the lengthy instruction after the question in the original version, it was succinctly stated and placed before the number of employees item. The instruction really applies to the next five items, so this was clearly stated. The ambiguous reference to the "quarterly withholding statements" in the original version of the instruction was replaced with an explicit reference to the "Federal Tax Return Form 941" in the revised version. Finally, the new instruction was changed from light-face italics to bold regular type.

Table 1 contains the rates of nonresponse and partial response for the number of employees item. Nonresponse rates for this item were relatively low, with significant differences across panels. This difference reflects the effect of the revised sequence, since the rate for Panel 3 was much higher than the others. The number of employees item comes relatively early in Panel 1 and 2 versions of the form. It is at the bottom of page 1 in Panel 1 and on page 3 of Panel 2; however, it is not asked until page 8 in Panel 3, and this fact seems to have significantly lowered response to this item. The level of partial response was significantly lower for Panel 2 than for either of the other two panels. Thus overall, more complete information was provided by respondents to Panel 2 than either of the other panels.

As a consistency check, data from the number of employees item was compared with administrative data from the IRS. These data, which represent the total number of employees during the pay period including the 12th of March, are reported in the first column of part c and are provided to the IRS by respondents on IRS Treasury Form 941. In this comparison, the percent difference between the two sources was calculated by subtracting the number of employees reported to the IRS from the number reported on the test questionnaires and dividing the resulting difference by the IRS value. Table 2 gives these results. A zero percent difference reflects an exact match between the sources. A negative value means that the number of employees reported on the test questionnaire was less than that reported to the IRS by the percent indicated, while a positive value means the opposite. According to the table, the alternative forms appear no more likely to elicit data consistent with IRS data than the control panel, nor does there appear to be any difference in the degree of discrepancy between the two sources across panels. On average, 38 percent of the reports exactly matched one another, with the degree of discrepancy between the two sources nearly symmetrical about this value. This was true regardless of panel type. This is contrary to our expectations, since the alternative panels contain a specific reference to the IRS Treasury Form 941. Since about 62 percent of the respondents to the alternative panels provided inconsistent information even with the instruction to use the Form 941, this suggests that the instruction may have been overlooked due to poor placement or sloppy reading by respondents. Another explanation is possible, however—it may be evidence of a conditioning effect. Respondents to this test are the same people who complete the census every five years. They are very familiar with the form and procedures for completing it. Given this, they may have simply completed the form the way they always do, and ignored the reference to the Form 941.

Table 3 presents the mean number of employees reported by respondents. As can be seen, the mean response for Panel 2 was lower than for the other panels, though not significantly so. This,

like the results of the above comparison, came as a surprise, since we expected to see significantly fewer employees reported in the revised panels. The findings of the cognitive interviews suggested that respondents tended to overlook the time period being referenced and, as a result, tended to overreport the number of employees they had. There are several possible explanations for the discrepancy between the actual results of the field test and those we expected. One possibility is that respondents' understanding of the time period here was really irrelevant if they relied on records that provided the correct information anyway, such as the Federal Tax Form 941. Since the majority of our respondents did not rely on their records during the cognitive interviews, perhaps this was something we had not come to realize. Another possible explanation is that the cognitive interviews were not representative of the construction establishments included in the field test. We conducted most of our interviews with respondents from single-unit establishments, while larger multi-unit establishments account for most of the employees reported in this item. A final possibility is that the same conditioning effect mentioned above occurred here and respondents continued to overreport the number of employees, as suggested by the cognitive interviews, regardless of the form they received.

The evaluation supplement mentioned earlier tried to assess the kinds of problems respondents had with the forms and the specific items with which they had these problems. One of the questions asked respondents if they thought the instructions included on the form were necessary. Those who answered no to this question were asked to report the questions for which they thought this was the case. Fourteen percent of the respondents in Panel 1 who answered no to the first question also said that the instructions for the number of employees item were unnecessary. In contrast, none of the respondents to Panel 2 and three percent of the respondents to Panel 3 held the same opinion about the revised version of this item. This confirms the results of the cognitive interviews and suggests that respondents successfully perceived the differences in the revised versions.

#### **Dollar Value of Business Done**

The original version of the Dollar Value of Business Done item is shown in Figure 3. In the original version of the form, this item is located at the bottom of the second page. As with the other items on the form, it begins with a heading. There are either three or four parts to this item, depending on the construction category. Nonbuilding and special trade contractors are asked parts a, c, and d shown in the figure, while the building contractors are asked all four parts. In all the forms, part a asks for the value of construction work done by the establishment in 1989, and is followed by an embedded subquestion that asks for the source of the reported data. Building contractors are asked a question unique to them about land sales in part b. In the parts that follow, respondents are asked to report their receipts from other kinds of businesses and the total dollar value of business done in 1989.

One of the problems with this item was that respondents tended to rely heavily on the heading as their source of information, often not reading the question or other information provided. This led to misunderstandings because the details of the information requested are not included in the heading. For example, respondents would read the heading and think that part a asked for the total dollar value of business done, when it really asks for the value of construction work. Respondents would then report the total in part a, rather than in part c or d where it belonged. If a respondent overlooked the question of part a, he was also likely to overlook the embedded subpart. It became evident during the interviews that respondents may have overlooked both the question and the subquestion in part a and still have put an answer in the answer space; however, this was really the total dollar value of

business done, not just the construction part.

Another problem that surfaced was that respondents did not really understand what was meant by "the dollar value of business done in 1989." Among other things, this asks for the dollar value of business done for only one year. If a company has a construction project that spans more than the calendar year (this work was frequently called work-in-progress), respondents are to report the value of the work they did on the project in 1989 only. However, respondents paid little heed to this and simply reported their income figure or sales or gross revenues here, without really understanding the underlying concept. Sometimes the value they reported did represent the calendar year simply because it was based on an accrual system of accounting; other times it did not.

Even respondents who read part a rather than just the heading had difficulty understanding some material. Respondents to the embedded subquestion frequently said they did not know the difference between "revenues" and "receipts", and almost all said they did not understand the meaning of the "exclude" statement at the bottom of part a. This statement reads "Exclude the cost of industrial and other specialized machinery which are not an integral part of a structure." Part of this misunderstanding was due to the respondent's interpretation of the words "machinery and equipment." As used here, "machinery and equipment" refers to equipment that a general contractor might purchase and install in a building, such as a printing press. This value should not be treated as construction work. However, most respondents thought that the words "machinery and equipment" referred to the machinery they use to do construction, and thus the statement did not make any sense. This misunderstanding may have been exacerbated by the use of the word "cost" in a question that is basically concerned with "value." Finally, respondents seemed to have trouble understanding "construction work on own account."

Building contractors misunderstood the special question they were asked in part b about "receipts from the sale of land." The in-depth interviews revealed that they thought this question referred to land without buildings. If they sold land with a building on it, they reported the combined value in part a, rather than reporting the value of the building in part a and the value of the land in part b. This was further complicated when a respondent read part a as the total dollar value of business done, rather than just the construction part. This led to reporting the value of the land twice, first in part a and again in part b. Respondents' misinterpretations of parts a and b seemed to be based on several factors. Keying in on the word "land" in the phrase "land development and improvements" in the list of part a seemed to suggest to respondents that they should report "land" values in part a, and overlooking the phrase "include buildings and other structures built for sale, excluding the value of land" seemed to contribute to their misreporting as well.

Part b of this item for most contractors (and part c on the form for building contractors shown in Figure 3) asked about "receipts from other kinds of businesses." Since special trade contractors tended not to have this source of income, they didn't have any problems with part b, but other contractors did underreport here.

Much of the time, respondents seemed to overlook part c (part d on the form for building contractors shown in Figure 3) concerning the total dollar value of business done in 1989. This seemed to be the case regardless of whether or not they interpreted part a as the total, and it may have been due to the placement of the item—it falls at the very bottom of the page.

The final result of all of these errors was systematic overreporting in part a and underreporting in parts b, c, and d on the part of our initial respondents. These were the largest errors in terms of dollar values uncovered during the interview sessions.

Another problem associated with the dollar value of business

done item and with the form in general involved the format for reporting dollar figures. Dollar figures are supposed to be reported in thousands of dollars rather than in dollars. An example of how to do this (shown in Figure 4) is provided at the top of page 2 of the form. Respondents are given answer boxes with a divided line down the middle in which to write dollar values. The answer space to the left of the divided line is for digits in the millions place and the one to the right of the line is for digits in the thousands. Digits in the hundreds should not be reported. However, respondents often erroneously report in dollars rather than in thousands-of-dollars, according to analysts from the 1987 census. Our review of completed forms from the 1987 census showed a different, but related problem--respondents often reported only one or two digits in the thousands box following an entry in the millions box. In other words, they did not zero-fill the second half of the number. This caused ambiguity about what the answers really were and different editing rules (in the 1987 census, the entries were left-justified) could cause systematic over or underreporting.

A collaborative effort between subject matter and survey methods experts yielded a newly-designed version of the dollar value of business item (shown in Figure 5). Besides removing the heading, the question concerning receipts for construction work done in part a of Panel 1 was greatly modified in Panel 2. The one original question became a question with four subparts in the revised version. Contract construction work done for others (part a of the original version) was also put first in the newly-designed version. Since most construction work is of this type, this is the only part of the item most respondents should have to answer. It was obvious to respondents that their answers should include values for "new construction; additions, alterations, and reconstruction" and the like, so references to these were left out of the new version. Also, the confusing embedded second question was entirely eliminated. Finally, the "exclude" statement, which was widely misunderstood by respondents, was reworded and put here where it applied.

Other information requested in the original version of this item needed modification. This was particularly true of the information from speculative builders, who should report values for work that was done but not sold in 1989 and who should report their unbilled work-in-progress from 1989. Also, they were supposed to include the value for improvements made to land associated with their building projects, but not the value of the land itself. Thus, a(2) was tailored to deal with the less tangible concept of "estimated values." The "include" and "exclude" statements that follow this question discuss the unsold, work-in-progress, and land issues in more detail than the original version. They use parallel construction--the "include" statements are balanced with the appropriate "exclude" statements to the right of them. Also, the headings of these statements emphasize the word "estimated."

As with a(2), a(3) was designed to deal with another aspect of "estimated values" that respondents seemed to have difficulty understanding, that is, "construction work on own account." This is the last item mentioned in the list of inclusions in the original version of the total dollar value of business item. In the new version, this phrase became an explicit question. As with the original version, a(4) asks for the value of all construction work.

Changes were made to parts b and c to maintain parallel construction with part a. Also, the list of inclusions in part b was alphabetized to make referencing them easier for the respondent. Finally, the answer format for reporting dollars was changed. The broken line that divided the millions place from the thousands place, which seemed to suggest to respondents that these places were independent of one another, was removed and a new heading "Dollars in thousands (\$)" was placed at the top of the answer

column. The "0" boxes to the right of the answer column were left as they were, since the cognitive interviews did not reveal any problem with them.

According to Table 4, neither the overall item nonresponse rate nor the partial response rate for the total dollar value of business differed significantly across panels. This is somewhat encouraging, since substantive changes to the question require three more answers in the alternative panels. It does suggest, however, that moving the item forward in the questionnaire was not helpful in increasing complete response, since item nonresponse did not decline significantly in Panel 3. It would seem that sequencing did not play the same kind of role here as it did with the number of employees item because of the difference in their positions relative to one another; the total dollar value of business item moved forward by 2 pages, whereas the number of employees item moved backward by 5 pages. It would appear that a 2-page difference was not enough to affect a change in item nonresponse rates, whereas a 5-page difference was.

Review of the results for individual subitems suggests relatively few differences. Item nonresponse for the value of construction work item is significantly different across all panels, with Panel 1 having a substantially lower level of missing data. This is to be expected, however, since this is the first item in Panel 1 and the fourth item in the other panels. If the first responses to the item are compared across panels (that is, total construction for Panel 1 and contract construction for the other panels), then the difference across panels is not significant.

Before evaluating the responses to this item, data reported in dollars were converted to dollars-in-thousands to eliminate possible confounding effects. Table 5 contains a comparison of the converted responses. It reveals that the mean responses to the total dollar value of business item did not change as a result of revisions to this item. We had expected to see lower levels of construction receipts reported in the revised panels (that is, total construction for Panel 1 compared to contract construction for the others) and higher levels of total receipts. However, as Table 5 shows, whether total construction is defined as the sum of the values reported in the first three questions or as the value reported in the fourth question (these are not always equal because of respondent errors), the results are not significantly different across panels. Similarly for the total dollar value of business done, differences in reports across panels are small and not statistically significant. This is somewhat disappointing. One thing to keep in mind, however, is that comparison of aggregate responses is not necessarily a measure of the accuracy of the responses. We do not have a measure of the "truth," to allow us to determine whether the respondents to the revised forms gave responses that were more accurate than those given by respondents to the control panel.

The evaluation supplement mentioned earlier also asked about questions that respondents found confusing. One of the more frequently mentioned questions that elicited response here was "dollar value of business." However, the percent of respondents who listed this item as confusing did not differ by panel.

### CONCLUSION

In this paper, we demonstrated the use of cognitive interview techniques to assess the Census of Construction Industries form. Through the use of these methods, respondent problems with the form were identified. Two examples of respondent problems, with the number of employees item and the dollar value of business item, were discussed in detail. Revisions to these two items, based on cognitive interview results as well as the experience of subject matter and questionnaire design specialists, were presented. And results of experimental testing of the revised forms, using a series of criterion measures, were provided.

A field test of the items produced mixed results. The revised

version of the number of employees item had more complete response, but no differences were observed in the average number of employees reported by respondents in comparison with the responses to administrative records. Results of the evaluation supplement suggest that respondents did perceive a difference in the instructions provided for this item on the form, and the revised version of the instructions were reported as more necessary than the original version.

Regarding the total dollar value of business item, no differences were observed in levels of item nonresponse or partial response. This is a somewhat positive result, given the difference in the complexity of the items on the two forms. Respondents to the revised version of the item reported the same levels of revenues than did respondents to the control version. No difference was observed in respondent perceptions about whether this question was confusing.

Thus, there is some evidence that the changes in each case were successful, but the results are certainly not overwhelming. However, in trying to assess the true effect of the questionnaire design changes, other factors must be considered.

First, other changes were made to the format of the questionnaires, as pointed out previously. All the experimental forms were printed in a booklet format, while the control form was on two longer, separate sheets of paper. This had the effect of confounding the effects of questionnaire revisions with the length and format of the form.

Second, the situation of the respondents to the Census of Construction Industries needs to be taken into account. The same respondents complete the questionnaire every five years; over time they become very familiar with the form, good or bad, and develop systematic ways of completing it. This sets up a context in which revised questionnaires may have the deck stacked against them. In testing new, revised questionnaires against the familiar questionnaire respondents have been working with for years, a conditioning effect is encountered. It is difficult to assess whether revisions are ineffective or whether respondents simply got used to answering questions in a certain way and did not want to change. In pursuing future questionnaire design research in situations of repeated interviews with the same respondent, we need to develop measurement strategies for dealing with these potentially contaminating conditioning effects.

Third, in addition to developing ways to deal with conditioning effects, we also need to implement better evaluation strategies so that we can better assess whether we have corrected the kinds of problems observed in the cognitive interviews.

#### NOTES

<sup>1</sup> Note that these rates are not strictly comparable because the 1987 census rate excludes multi-unit cases.

#### REFERENCES

DeMaio, T.J. and C. Jenkins. 1989. "Review of the 1987 Census of Construction Industries Questionnaire and Instruction Sheet," Internal Census Bureau memorandum. December 4, 1989.

DeMaio, T.J. and C. Jenkins. 1991. "Preliminary Results of the Census of Construction Industries 1989 Pretest," Internal Census Bureau memorandum. April 15, 1991.

**Table 1. Levels of Response for the Number of Employees Item by Panel.**

Levels of Response	Panel				P value*
	Total	1	2	3	
Total Nonresponse	2.6	2.2	1.6	4.0	.020
Partial Response	12.7	14.4	9.8	13.6	.032
Complete Response	84.7	83.4	88.6	82.4	.005
N	1966	690	605	671	

\* Probability associated with the X<sup>2</sup> value for panels 1 through 3. The base for this analysis includes respondents from both construction and nonconstruction establishments.

**Table 2. Consistency of Reports between the Number of Employees Item and Administrative Data by Panel.**

Percent Difference Between the Number of Employees Reported On the Form and Administrative Data:	Total	Panel		
		1	2	3
101 and over	2.5	2.5	2.4	2.4
51 to 100	4.6	5.4	3.5	4.7
1 to 50	20.8	22.8	18.7	20.7
0	37.5	35.6	38.1	39.0
-1 to -50	29.5	28.3	32.4	28.1
-51 to -100	5.4	5.0	5.2	5.2
N	1714	593	541	580

X<sup>2</sup> = 7.7, d.f. = 10, p = N.S. The base for this analysis includes both construction and nonconstruction establishments for which the total number of first quarter employees are reported and administrative data (other than 0) are provided to the IRS.

**Table 3. Average Reported Number of Employees by Panel.**

Number of Employees	Panel			P value*
	1	2	3	
Average	199	163	216	N.S.
Std Error	74.9	49.4	50.8	
N	665	595	640	

\* Probability associated with F-value for panels 1 through 3. The base for this analysis includes both construction and nonconstruction establishments and excludes nonrespondents to the construction workers and other employees subitems.

**Table 4. Levels of Response for the Total Dollar Value of Business Item by Panel.**

Levels of Response	Panel				P value*
	Total	1	2	3	
Total Nonresponse	3.1	3.0	3.3	2.8	N.S.
Partial Response	12.2	10.4	13.1	13.3	N.S.
Complete Response	84.7	86.6	83.6	83.9	N.S.
Nonresponse for:					
Contract Work	5.7		6.5	5.1	N.S.
Speculative Work	9.4		10.1	8.8	N.S.
Construction for Self	9.3		9.8	8.8	N.S.
Total Construction	7.2	4.5	9.3	8.2	.002
Other Activities	9.9	10.0	9.4	10.1	N.S.
Total Dollar Value of Business	5.8	7.0	5.6	4.8	N.S.
N	1966	690	605	671	

\* Probability associated with the X<sup>2</sup> value for panels 1 through 3. The base for this analysis includes respondents from both construction and nonconstruction establishments.

**Table 5. Average Reported Receipts (in Thousands of Dollars) by Panel.**

Receipts (in Thousands of Dollars)	Panel			P value*
	1	2	3	
Total Construction in Panel 1 and Contract Construction in Other Panels				
Mean	\$ 5319	\$ 3793	\$ 6433	N.S.
Std Deviation	18157	10716	34440	
N	466	424	470	
Total Construction in Panel 1 and Sum of Contract, Speculative, and Own Construction in Other Panels				
Mean	\$ 5319	\$ 3943	\$ 6881	N.S.
Std Deviation	18157	10753	34446	
N	466	425	474	
Total Construction				
Mean	\$ 5319	\$ 4016	\$ 7042	N.S.
Std Deviation	18157	10882	35102	
N	466	415	456	
Other Business Activities				
Mean	\$ 125	\$ 161	\$ 429	N.S.
Std Deviation	938	832	4264	
N	439	404	444	
Dollar Value of Business Done				
Mean	\$ 5344	\$ 4096	\$ 7251	N.S.
Std Deviation	18507	10880	45396	
N	456	424	470	

\* Probability associated with F-value for Panels 1 through 3. The base for this analysis includes cases that went through the dollar conversion program (that is, they include reports of total payroll, total receipts, and a valid industry code) and excludes nonrespondents for the subitem.

**Item 5 - NUMBER OF EMPLOYEES**

How many paid employees, permanent or temporary, full-time or part-time, were on the payroll of THIS ESTABLISHMENT during the pay periods shown at the right? Include those on paid sick leave, paid holidays, and paid vacations as well as those actually working. If a corporation, include salaried officers and executives of the establishment. If unincorporated, exclude proprietors or partners. Include all employees for whom you file quarterly withholding statements. Do not include your subcontractors or their employees.

	Number of employees of this establishment during the pay period including the 12th of -			
	March 1989	May 1989	August 1989	November 1989
a. Construction workers - Include -				
<ul style="list-style-type: none"> <li>Laborers</li> <li>Apprentices</li> <li>Craftsmen</li> <li>Equipment operators and mechanics</li> <li>Truck drivers and helpers</li> <li>On-site record keepers</li> <li>Others engaged directly in construction operations, including supervisors up through the working foreman level</li> </ul>	101	102	103	104
b. All other employees - Include -				
<ul style="list-style-type: none"> <li>Executives</li> <li>Professionals</li> <li>Technicians</li> <li>Purchasing</li> <li>Accounting</li> <li>Personnel</li> <li>Office staff</li> <li>Supervisors above the working foreman level</li> </ul>	105	106	107	108
c. TOTAL NUMBER OF EMPLOYEES - Sum of lines a and b above	109	110	111	112

Figure 1. The Original Version of the Number of Employees Item.

Your answers to 5 through 8 should be based on all employees for whom you filed withholding statements (Federal Tax Return Form 941). Do NOT include your subcontractors or their employees.

**5. During the pay periods which include the 12th of March, May, August, and November 1989, -**

	Number of employees			
	Pay period including the 12th of March 1989	Pay period including the 12th of May 1989	Pay period including the 12th of August 1989	Pay period including the 12th of November 1989
a. how many construction workers were on the payroll of this establishment?				
Include - <ul style="list-style-type: none"> <li>Working foremen</li> <li>Job-site record keepers</li> <li>Laborers</li> <li>Apprentices</li> <li>Journeyman</li> <li>Craftsmen</li> <li>Equipment operators and mechanics</li> <li>Truck drivers and helpers</li> <li>Others engaged directly in construction</li> </ul>	101	102	103	104
b. how many other employees were on the payroll of this establishment?				
Include - <ul style="list-style-type: none"> <li>Supervisors</li> <li>Job-site and home office clerical and maintenance staff</li> <li>Personnel staff</li> <li>Purchasing agents</li> <li>Accounting staff</li> <li>Technicians</li> <li>Architects</li> <li>Engineers</li> <li>Professionals</li> <li>Executives</li> <li>Others engaged in non-construction activities</li> </ul>	105	106	107	108
c. how many total employees were on the payroll of this establishment? Sum lines a and b.	109	110	111	112

Figure 2. The Revised Version of the Number of Employees Item.

**Item 13 - DOLLAR VALUE OF BUSINESS DONE IN 1989**

a. What was the value of all construction work done by this establishment in 1989? Report your best estimate using either billings, revenues, receipts, or other estimate of value of construction work done. Include construction work for sale but unused, by reporting the costs of such construction plus normal profit. Also report the cost of construction work done for rent or lease or for your own use. Refer to instructions for further explanation.

Reported data based on - Mark (X) in appropriate box:  
 1 Billings  2 Receipts  
 3 Revenues  Other - Specify \_\_\_\_\_

**INCLUDE**

- New construction
- Additions, alterations, or reconstruction
- Special trades contracting work
- Maintenance and repair work
- Land development and improvement
- Installation and service of equipment
- Buildings and other structures built for sale, excluding the value of the land
- Construction work on own account

**EXCLUDE**

- The cost of industrial and other specialized machinery which are not an integral part of a structure

b. What were your receipts from the sale of land in 1989? Report only the receipts from the sale of the land, excluding the value of improvements. The value of land development and improvements should be reported as construction work on line a above. If book figures are not available, reasonable estimates are acceptable.

c. What were your receipts from kinds of business other than those reported in lines a and b above in 1989?

**INCLUDE**

- Architectural and engineering services
- Construction management/consulting services
- Wholesale trade
- Retail trade
- Realty services
- Rental of machinery, equipment, or buildings to others
- Manufacturing
- Transportation
- Materials sold to contractors

d. TOTAL dollar value of business done in 1989 - Sum of lines a through c

	Mill.	Thou.	
137			<input type="checkbox"/> 0
138			<input type="checkbox"/> 0
139			<input type="checkbox"/> 0
140			<input type="checkbox"/> 0

Figure 3. The Original Version of the Dollar Value of Business Item for Building Contractors.

**HOW TO REPORT DOLLAR FIGURES**

Report dollars rounded to thousands.

Example: If a figure is \$1,125,628 - Report 1 125

If item value is equal to "0" - Mark (X)

Millions (000)	Thousands (000)	Mark (X) if "0"
1	125	<input checked="" type="checkbox"/>

Figure 4. The Example of How to Report in Thousands of Dollars.

**13a. For this establishment in 1989, -**

	Key	Dollars in thousands (\$)	Mark (X) if "0"
(1) what were the receipts or billings for all contract construction work done for others? Exclude the dollar value of items purchased by the establishment that were installed in a building but were not part of its structure, such as production machinery, furniture, etc.	141		<input type="checkbox"/> 0
(2) what was the estimated dollar value of speculative construction work done on residential and other building projects which you sold or intended to sell? Include the estimated dollar value of - Exclude the estimated dollar value of -			
<ul style="list-style-type: none"> <li>work actually done in 1989, whether buildings were sold or not.</li> <li>work in progress, that was actually done in 1989.</li> <li>all improvements to land associated with these building projects done by or for you in 1989.</li> <li>work done before January 1989 and after December 1989.</li> <li>land. Even though land would generally be included in the value of your building projects, the value of the land is not considered construction work done.</li> <li>work done in 1989, for rent or lease.</li> </ul>	142		<input type="checkbox"/> 0
(3) what was the estimated dollar value of construction work done for this establishment's own use, i.e., not intended for sale, rent, or done under contract for others?	143		<input type="checkbox"/> 0
(4) what was the dollar value of construction work done? Sum lines (1) through (3).	137		<input type="checkbox"/> 0
b. What was the dollar value of receipts or billings for all other business activities done by this establishment in 1989?			
<b>Include -</b> <ul style="list-style-type: none"> <li>architectural services</li> <li>building on your own land for rent or lease</li> <li>construction management services</li> <li>engineering services</li> <li>manufacturing</li> <li>mining</li> <li>real estate agents and managers</li> <li>rental of construction machinery or equipment to others</li> <li>retail trade</li> <li>subdividing and preparing your own land into lots, for sale, rent, or lease</li> <li>transportation</li> <li>wholesale trade</li> <li>other business activities</li> </ul>	139		<input type="checkbox"/> 0
c. What was the total dollar value of all business done by this establishment in 1989? Sum lines 13a(4) and 13b.	140		<input type="checkbox"/> 0

Figure 5. The Revised Version of the Dollar Value of Business Item.