CONSTRUCTION PERSONNEL ROLE AND INFORMATION NEEDS

By Kwaku A. Tenah,[1] M. ASCE

ABSTRACT: In management practice, personnel functions and personnel information needs are the very first areas that are systematically tackled. This is because a manager or supervisor cannot perform his/her functions efficiently without proper information on which to base decisions. However, construction industry studies and researchers do not emphasize these areas. Thus, there is a lack of information in the construction industry regarding functions, responsibilities, and information needs of construction personnel. Results are presented of a field study conducted to determine: (a) The primary role of the key individuals at the various management levels (i.e., their functions, responsibilities and authorities); and (b) the type of information these personnel require in order to effectively perform their functions. The management level grouping approach is used to present the role and information needs of the key construction personnel identified in the study.

INTRODUCTION

Success in construction comes with applying effort intelligently at a price for a stated time. Such service assumes knowledge of the construction method, the costs and time of production. Performance of this service requires knowing contractual types, contractual methods, resource requirements and information networks. Basic to all work are the human elements—who does what, who is responsible for what, what are the key relationships, what kind of management techniques are applied, what are the information needs of the company's key personnel and so forth. This is because humans guide and do the work and establish the cost and production rates, that is to say, humans generate the necessary information upon which decision-making is based.

A manager cannot manage efficiently without proper information on which to base decisions. However, management theories, management books, construction magazines or publications, and construction researchers are generally silent on the functions and information needs of construction management personnel. In management practice these are the very first areas tackled systematically (11). Some management books outline general functions of such key personnel as the superintendent, general foreman, construction or project manager and estimator, as well as the overall functions of the company and the key departments (1–9). Great care, however, is not taken to delineate the functions and the information needs of key personnel from the chairman of the board of directors to the foreman in the organization (10–14).

[1]Asst. Prof. of Civ. Engrg., Texas A&M Univ., College Station, TX 77843.

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METHODOLOGY

The lack of information in the construction industry regarding functions, responsibilities and information needs of construction personnel, and the link between personnel functions and their information needs prompted the writer to conduct a survey to determine their primary functions and information needs.

Initially, letters were sent to seventy-five owners and/or presidents of construction firms in Austin, Dallas, Fort Worth, El Paso, Houston, Junction, San Antonio, Temple, Richardson, and Bryan, TX, asking permission to interview key management and supervisory personnel. A summary of the objectives, the proposed procedure, and the nature of problems the study proposed to solve was attached to these letters. Draft copies of the questionnaires were enclosed to give the owners/presidents a better understanding of the study and of what the interview would entail, and also to give them an idea of which of their employees would be involved in the interviews. Eight construction companies participated and filled in the questionnaires. Sixty-three questionnaires were returned for analysis. In addition, personal interviews were conducted with employees of another eight contractors using a revised questionnaire. Thus, 16 firms involving 177 construction personnel provided data suitable for analysis.

All of the 16 firms in the study are located in Texas, though their businesses are national in scope. Eight of the firms have international operations. All are rated in the category medium-to-large by the Associated General Contractors of America. The characteristics of the construction companies that participated in the study are provided in Table 1 in Ref. 14. The questionnaires and personal interviews were designed to elicit detailed information on the functions and responsibilities of key construction personnel, information needs, reporting structure and identification of management levels. The questions relating to the functions and responsibilities and information needs were edited and arranged in a matrix format in the following order: general administration, market development, public relations, estimating/bidding, engineering, pro-

TABLE 1.—The Board of Directors and Its Chairman's Function and Information Needs

Primary functions (1)	Primary information needs (2)
Sets out company objectives.	Environmental information (social, political, and economic climate the company hopes to operate in).
Formulate company plans and strategies.	Competitive information (past performance, present activities, overall growth and future plans of competing companies).
Exercises responsibility for overall growth and profitability of company.	Internal information (financial, operational and non-quantitative data from the company).
Acts as liaison between the board and the presidents' level (solely performed by the chairman of the board of directors).	

curement, and construction. The rest of the questionnaire that dealt with the organizational and reporting structures was presented as charts which the persons interviewed were asked either to draw or to modify. The revised questionnaire covered the same areas as the first one except that the questions were condensed. Also, the format was different in that direct questions were asked on their functions, responsibilities, etc. Here too the charts covering organization types, management levels, and reporting structures were used.

The functions of managers and their information needs that this paper presents resulted from the summary of the responses received from the interviews conducted. First, the raw data from the questionnaires (i.e., functions, responsibilities, information needs, reporting structure, organizational types) were assembled together by the classification (e.g., president, project manager, superintendent, etc.) of the people interviewed. For example, all the functions from all the presidents were assembled. Second, the most common functions and information needs from each classification were selected. For classifications with five or more managers a function or information need was considered common when enacted by 60% or more of the managers in that classification. 75% was used as the lowest acceptable percentage for four or less managers in a classification. The number of responses obtained was not adequate for elaborate statistical analysis. However, the results received from the managers and supervisors were very consistent. Also, the sample size used gave a good representation of the companies in the medium-to-large contractor category. Therefore, the results presented in this paper can be said to be representative, with a few modifications, of the companies in the medium-to-large contractor category. The findings were so consistent that no problem was encountered in identifying the common functions or information needs.

This paper presents the roles of the key individuals in the organization—their functions, responsibilities and authorities. It also presents the types of information that each of the managers in the five management levels identified in the study requires in order to perform his/her respective role. This paper begins by presenting the functions and information needs of managers at the director level, followed by those of managers at the president level, and those of managers in the construction management and functional management level. The functions and information needs detailed in the tables are reverse-ordered. This grouping approach is used because managers at the same level tend to perform similar functions, have similar responsibilities and authorities, and require the same format and level of detail of information. The functions and information needs of each manager are presented in Tables 1 through 26, commencing with the board of directors and progressing downwards through the foremen. The functions and information needs detailed in each table are those that have been identified by individuals with experience in a position with the specific job title. Note that some organizations may reverse some titles: for example, construction manager versus project manager. The reader is cautioned not to be concerned with the semantics of titles, but rather with the functions and information needs that are the main consideration.

Functions and Information Needs at the Director's Level

The primary functions and responsibilities of the board of directors of a construction company as revealed by the research are described in Table 1. Additional functions performed by the director's level include the following:

1. Setting out who makes which decisions in the organization and at what time, and which specialists are required.
2. Organizing lines of communication, and guiding research and development.
3. Standardizing procedures, e.g., standing orders.
4. Making marketing and investment decisions.

It was learned from the study that the board's plans and strategies: (1) Are prepared at 3–5 yr intervals and are therefore long range in nature; (2) form the guiding policy for annual plans and general policy, decisions affecting the plan of work, and general future approach; and (3) have an influence on all members of the organization and tend to have an impact even outside the organization. Again, the study revealed that the board allows flexibility and some spare capacity so that certain facilities exist: (1) To deal with peculiar circumstances; (2) to plan the way ahead; (3) to properly evaluate feedback; and (4) to answer questions like, "How did we get here?", "Which changes are necessary?", and "How successful is our estimating?". Furthermore, it was learned that the chairman of the board of directors is usually the chief executive officer as well as the leader of the members constituting the board.

It was discovered from the study that the information this level requires in order to perform these functions is of three basic types, namely, environmental information, competitive information, and internal data.

The functions and the information needs of the chairman and the board of directors' level are presented in Table 1.

Functions and Information Needs at the Presidents' Level

This level consists of the president, the vice presidents (finance, engineering, operations, and administration), the directors of procurement, and public relations, and the various chiefs, e.g., engineer, accountant. The directors and the chiefs are added to this level because it was revealed in the study that most of the vice-presidents perform functions similar to the chief and/or directors.

In general, the major functions performed by the president level as a group include: (1) Checking current trends in the construction industry especially on works that lie in the company's area(s) of expertise (e.g., power plant construction, public works, etc.); (2) assisting and advising the chairman, the board of directors, and those within and below this level; (3) soliciting and/or acquiring business; (4) selecting, training, and assigning key company personnel; (5) managing the company based on the board's immediate plans and strategies.

TABLE 2.—The President's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Formulates broad company policies including public and industrial relations and personnel policies. Directs and bears general responsibility for the company as a whole. Contacts architects, engineers, owners and other contractors to request or seek opportunities and invitations to bid, negotiate or be considered for selection. Establishes company's major objectives and operating controls. Analyzes status of ongoing projects. Reviews construction business forecast and legislations. Advises and assists vice-presidents and other key company personnel.	Corporate strategic plans and policies including feedback from the board. Tailored format of the environmental, competitive and internal information. Construction business development. Summary cost, schedule, and financial reports on all current projects.

TABLE 3.—The Vice-President—Finance's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Exercises responsibility over the company's detail financial planning, administration, and control. Advises and assists the president and other vice-presidents on financial matters. Reviews construction business forecasts and legislations. Analyzes status of on-going projects.	Financial business developments, construction forecasts, and related financing. Directors' financial plans and policies. Labor agreements and government regulations. Projects' summary cost and financial reports.

TABLE 4.—The Vice-President—Operations' Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Bears responsibility for managing engineering services, project design, planning and scheduling, and program control activities. Represents the company in high-level policy matters and contracts negotiations. Reviews, analyzes, and evaluates all projects' progress reports. Keeps abreast of all legislation affecting construction business and forecast on construction.	Legislation affecting construction business and forecast on construction. Market and labor trends including international data. Projects' summary cost, schedule, financial, and progress reports.

TABLE 5.—The Vice-President—Administration's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Defines management functions and responsibilities. Determines, implements, and monitors administrative systems and procedures required for managing company. Directs legal counseling, public and employee relations and publication, employment, transportation and other general administration. Keeps abreast of labor agreements, legislations, laws, regulations, and directions.	Company growth pattern and trends in the construction industry. Changes in the organization and volume of work. Government and/or labor regulations and labor agreements. Unemployment situations, industrial and labor relations reports, and safety, health and welfare information.

TABLE 6.—The Procurement Director's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Manages purchasing, inspections, expediting, traffic and transportation of the needed materials, services, and equipment at the required quality, quantity and time, and at the lowest ultimate cost. Coordinates closely the procurement activities with management, engineering, estimating, operations, and other divisions or subdivisions of the company.	Comprehensive project costs, schedules, and progress reports, including trend forecast and procurement status. Bid results, vendor list, contracts, invoices, and allotment of funds report. Materials, labor, and equipment price trends, delivery patterns, and product changes. Government regulations on safety, inspection, traffic, and transportation of materials, services, and equipment.

Note: Most of the companies interviewed are tending toward central purchasing rather than project-oriented purchasing.

TABLE 7.—The Chief Accountant's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Develops company's accounting procedures. Directs such functions as preparation and maintenance of records, costs, cash flow, bill processing and payments, and internal auditing.	Labor agreements, government regulations on wages, tax, and insurance. Summary project financial and costs reports, including trend forecasts.

This level requires a much more detailed and departmentalized format for environmental, competitive, and internal information. It also requires progress reports that summarize each project's status, current and future cost, schedule performance, problems, and management actions underway to resolve those problems. These progress reports must show the profit or loss against the net billing and target rates, plus the production for the future in terms of the project cost and schedule goals for the month, the current year and to date.

Tables 2 through 7 define and explain the functions and information needs for the key managers at the president level.

Functions and Information Needs at the Construction Management Level

The personnel included in this level are: (1) The operations manager; (2) assistant/deputy chief engineer; (3) chief estimator; (4) district/division engineer; (5) procurement manager; (6) construction manager; (7) labor relations manager; and (8) public relations officer.

The major function of the construction management level is obtaining and monitoring work for the company at the district or divisional level. Some of the additional functions performed by this level generally include:

1. Establishing and maintaining friendly relationships as well as making sales contacts with owners, architects, engineers, contractors, public officials, and other business and organizations at district/divisional level.
2. Implementing all management functions, engineering services, product design, planning/scheduling, and program control activities at the district/divisional level.
3. Receiving and analyzing all progress reports, costs, schedules, etc. on all projects within the district or division.
4. Selecting, training, and aiding district/division managers.
5. Managing research and development authorized by the board.

TABLE 8.—The Operations Manager's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Performs sales and marketing functions.	Legislation and forecasts affecting construction business.
Establishes and implements procedures for carrying out cost control, estimates, billings, planning and scheduling.	Summary cost, schedule, financial progress and critical items action reports on projects under his jurisdiction.
Supervises new work for bidding and the work of construction managers.	Manpower requirement, availability, wages, and training.
Manages research and developments.	Research and development reports.

Note: Operations managers, most of the time, are in charge of district or division offices under the title "District" or "Division Manager."

TABLE 9.—The Chief Estimator's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Supervises and coordinates home office estimating and post-bid analysis. Assists in employing and training estimators. Advises clients as to cost reduction, improved materials and other factors affecting construction.	Contract documents outlining project scope, specifications, quality, and blue prints. Construction and engineering methods, value engineering, and experience data. Summary cost, schedule, financial, and progress reports.

TABLE 10.—The District/Division Engineer's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Manages and supervises the engineering department for the district/division to which he is assigned. Performs such functions as estimating, plant design, and staffing.	Construction and engineering methods and experience data. Summary cost, schedule, financial, and progress reports. New introductions, management changes, volume of work, and construction/engineering business developments. Job staffing requirements.

TABLE 11.—The Procurement Manager's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Manages purchasing, expediting, inspection, traffic, and transportation of services, equipment, and materials at the district or division level. Assists suppliers and subcontractors on technical matters regarding quality, quantity and timing. Staffing.	Purchase orders for lead items and related documents. Bid results, vendor list, contracts, invoices, and allotment of funds. Materials, labor, and equipment price trends, delivery patterns, and product changes. Government regulations on safety, inspection, traffic, and transportation of materials, services, and equipment. Summary cost, schedule, and progress reports with trend forecast and procurement status.

This level requires a summary format of the three basic types of information (environmental, competitive, and internal) that apply to their geographic areas. In addition, this level requires, on each project under their jurisdiction, a clear and straightforward summary format of information on: (a) General progress; (b) financial status; (c) schedule status;

TABLE 12.—The Construction Manager's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Manages all engineering, design, and construction operations and program services for projects under his jurisdiction. Supervises subcontractor source selection and negotiation. Analyzes and evaluates all projects' cost, schedule and progress reports.	Legislation and forecasts affecting construction business. Summary cost, schedule, financial, and progress reports. Materials, labor, and equipment price trends, delivery pattern, product changes, and vendor lists. Client relations.

TABLE 13.—The Labor Relations Manager's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Exercises responsibility over all matters pertaining to the company's relationships with the union and labor agreements. Determines labor availability, productivity, prevailing wage rates, and working conditions. Maintains close liaison between job sites, labor representatives, and the vice-president—administration.	All local, national, and international union contracts and agreements. Government laws and regulations on labor, wages, taxes, and insurance. Activities of unions on jobs including productivities and labor cases between management and labor.

(d) engineering and procurement status; and (e) problems that call for management action(s).

The functions and information needs of the key managers at this level are presented in Tables 8 through 13.

TABLE 14.—The Project Manager's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Bears the responsibility for getting the project completed within the quality, time, and cost requirements. Coordinates and acts as a liaison between the field, engineering, procurement, the client, and the local unions. Directs and assumes responsibility for the project's field work, estimating, scheduling, purchasing, expediting, budgeting, labor and manpower leveling. Reviews, inspects, evaluates, and reports quality and progress of the project.	All contract documents and job staffing requirements. Union and labor activities, including productivity, availability, wages, willingness to work, etc. in the area the project is located. Feedback from the construction manager. Project's detail cost, schedule, financial, and progress reports including procurement, subcontracts, engineering, drawing status, and critical items.

Functions and Information Needs at the Project Management Level

The project management level consists of: (1) The project manager; (2) assistant/deputy chief estimator; (3) planning and scheduling engineer; (4) cost engineer; (5) estimator; (6) purchasing agent; (7) accountant; (8) safety engineer; (9) resident project engineer; and (10) field/office engineer.

The major functions of the project management level are: (a) Managing the day-to-day operations of all aspects of a project; and (b) watching closely the development of the project as a group so as to respond intelligently when any problems crop up.

The information needs of this level are the same as those of the con-

TABLE 15.—The Resident Project Engineer's Function and Information Needs

Primary functions (1)	Primary information needs (2)
Handles site analysis surveys, design and drafting, project plans and specifications, shop drawings, and construction cost, estimates, and schedules.	Contract documents outlining the project scope, specifications, and quality.
Relieves the project manager of such administrative matters as management of change orders, updating progress schedules, conventional engineering practices, and monitoring delivery schedules.	Construction and engineering methods, experience, and value engineering data.
Exercise liaison with field and home office engineering.	Union and labor activities including productivity, availability, wages, willingness to work, etc., in the area the project is located.
Supervises and coordinates the work of all project engineers.	Project's summary cost, schedule, financial, and progress reports including procurement, subcontracts, engineering, drawing status, and critical items action.

TABLE 16.—The Assistant/Deputy Chief Estimator's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Directs estimators and prepares quantity surveys.	Contract documents outlining project scope, specifications, quality plus blueprints.
Solicits and selects subcontractors and vendors.	Historical and value engineering reports, experience data, vendor and subcontractor lists, construction and engineering methods.
Maintains performance records and cost files.	Summary cost, schedule, financial, and progress reports backed up with subcontractors and vendor's performance reports.
Assembles cost studies as specified by the cost engineer, chief estimator or the operations manager.	

Note: He acts for the chief estimator in his absence.

TABLE 17.—The Planning and Scheduling Engineer's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Exercises responsibility for planning, scheduling, and programming construction and engineering operations to be performed on a new project. Prepares and monitors manpower, materials, and equipment requirements schedules. Prepares weekly and monthly schedules, and progress and status reports. Monitors and updates specific projects monthly or as necessary and reschedules when the need arises.	Engineering scope, specifications, blueprints or quantities, and working knowledge of the project. Historical reports on similar projects including labor performance and/or productivity. Schedule and progress reports from field engineers.

TABLE 18.—The Cost Engineer's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Finds the most economical combination of men, machines, and materials required to build a project. Prepares all cost reports, cost engineering procedures, classifications of accounts, cost codes, and cost distribution, as well as the deviations. Analyzes and controls costs, maintains cost records and reports, and effectively forecasts the financial outcome of each project.	Engineering scope, contract terms, specifications, blueprints, take-offs, and estimate/budget. Historical cost and value engineering reports, including subcontractors and vendor reports, and productivity data. Detail to-date schedule, cost and progress reports, including commitments status.

TABLE 19.—The Estimator's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Bears the responsibility for reading drawings and making quantity surveys from either complete or incomplete drawings for job costing. Prepares proposals, estimates, budgets, costs, and forecasts for project(s). Monitors weekly labor costs, and all materials, plant, and equipment cost records.	Blueprints, specifications, and other contract documents including site visits. Historical cost and value engineering reports including subcontracts and vendor reports. Budget, cost commitment, detail cost, and progress reports of current projects.

TABLE 20.—The Purchasing Agent's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Determines the most economical source from which materials, stores, supplies, equipment, plant, parts, and services of specified quantity and quality can be purchased, expedited, and transported at the optimum prices and within the schedule. Interviews salesmen, secures quotations, prepares and/or approves contracts and specifications. Maintains source files, arranges transportation, routes and coordinates volume purchases.	Material requisitions and purchase orders. Contracts' details including subcontractors' planning, formation (i.e., preparation, bidding and award), execution, and administration. Project commitment, procurement, drawing status, critical items action, and trend forecast reports. Vendor and subcontract lists.

TABLE 21.—The Accountant's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Exercises responsibility for job accounting systems, records, entering job costs, and keeping balance with ledger. Supervises timekeeping, prepares payroll, receives and checks materials, processes invoices and vouchers for payment and disbursements made. Records money committed and/or approved and disbursement made. Issues financial statements to management.	Detail project cost, schedule, financial, and progress reports. Procurement status, field labor (time cards, etc.), commitments, subcontracts, purchase orders, contractor payment approval, back charges, and change orders.

TABLE 22.—The Safety Engineer's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Bears the responsibility for implementing the company and other safety programs on his project. Makes accident reports, supervises blasting, and takes charge of explosives and safety supplies. Performs such labor relations functions as interpreting union regulations, settling disputes, etc.	OSHA and other safety regulations and laws, and latest developments in construction safety. Specifications and other relevant information on the various equipment, plants, lifting devices, explosives, blasting handling, setting up, and detonation. Weekly labor and accident reports. All local, national, and international union contracts and agreements, and government laws and regulations on labor.

struction management level except that their reports are backed up with other detailed information such as: (a) Field report on cost and progress; (b) summary and/or detail schedules (or checklist); (c) list of critical or near-critical items within the networks; (d) detailed prediction of future accomplishment in terms of project cost and schedule goal; (e) detailed current cost and working estimates; and (f) cash flow summaries.

It was learned from the study that reports going to managers at this level are action reports. Such reports are tailored to suit the needs of the individuals concerned. The objective here is to avoid flooding all managers of this level with massive information typical of large projects.

Tables 14 through 22 detail the functions and information needs of the managers at this level.

Functions and Information Needs at the Functional Management Level

The functional management level includes: (1) Field engineers/field office engineers; (2) the general superintendent; (3) the superintendent; and (4) the foreman. The general foreman is not included in this section because the study showed that he performs functions similar to the foremen, the only difference being that the general foreman supervises and coordinates the work of two to five foremen while the foreman is in charge of at least five tradesmen.

The major functions and responsibilities of the managers and supervisors at this level are to organize, supervise and/or coordinate personnel, equipment, materials and services in the most profitable way to ensure that all construction projects are built within the budget, time, safety and quality requirements. This is the level at which data are collected and used for forecasting, estimating, planning, and scheduling pur-

TABLE 23.—The Field Office Engineer/Field Engineer's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Exercises responsibility for managing inspection, reports work accomplished and potential problems with proposed solutions, and coordinates drawing, papers and submittals. Expands the preliminary schedules into greater detail schedules and monitors the same. Reviews changes and negotiates prices with contractors on adjusted prices. Assists the general and other superintendents and foremen in scheduling their work, in expediting materials delivery, and checking the progress of subcontractors.	Details of project cost, schedule, commitments, field labor, procurement, and critical items action reports. Field inspection and verbal data from field superintendents and/or foremen. Blueprints, specifications, quantities, and productivity data.

TABLE 24.—The General Superintendent's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Organizes and supervises the superintendents, general foremen and/or foremen, and subcontractors for the construction operations related to his project(s). Implements much of the management decisions, like construction methods, schedules, safety and quality regulations, and how the project is to be equipped on the site. Supervises and/or monitors such preconstruction activities as preparing preliminary schedule, obtaining permits, insurance requirements, approving starting date, and job staffing.	Blueprints, specifications, and other contract documents. Local union and labor activities, safety regulations, labor agreements, quality control and testing regulations. Work status and progress reports, master schedule, detail schedule for each area, and critical item action reports. Purchase order control, shop drawing and sample control, procurement status, field labor, back charges, vendor and subcontractor, and change order reports.

TABLE 25.—The Superintendent's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Supervises and organizes the work of the general foremen/foremen, and equipment, materials, and services to ensure that the project is built within the required time, budget, safety, and quality standards. Directs all pre-construction activities to ensure that field work proceeds smoothly. Directs inspection and completes punching lists, warranties, and operating data.	Blueprints, specifications, and other contract documents. Local union and labor activities, safety regulations, labor agreements, quality control, and testing regulations. Works status and progress reports, detailed schedule for his area, critical item action reports, and field diary. Purchase order control, shop drawing and sample control, procurement status, field labor, back charges, vendor and subcontractor, and change order report.

TABLE 26.—The Foreman's Functions and Information Needs

Primary functions (1)	Primary information needs (2)
Organizes and coordinates employee engaged in a specific craft or function on a construction project. Reads and interprets drawings, blueprints, and specifications. Allocates, assigns, and inspects work. Administers union agreements and safety enforcement; hires and trains employees.	Blueprints, specifications, and other contract documents. Local union activities, safety regulations and laws, labor agreements, quality control, and testing regulations. Shop drawing and sample control, procurement status, bar chart by system or area, production schedules, and field performance reports.

poses. The functional management level requires performance and productivity information on the organizational units that each manager or supervisor handles as well as detailed analyses of the problem areas.

The functions and information needs of the managers at this level are presented in Tables 23 through 26.

Summary and Conclusions

The primary functions performed by the key construction personnel at the various levels differ fundamentally from each other. These functions range from setting out company objectives, formulating company plans and strategies, and making marketing and investment decisions through acquiring business to organizing, supervising and coordinating personnel, materials, equipment and services to construct a project within time, budget, safety and quality standards.

The study showed that: (1) Management functions and responsibilities, and information needs are inextricably linked; (2) each manager or supervisor cannot perform his or her functions efficiently without accurate, timely and relevant information on which to base decisions; (3) the information that the key construction personnel receive and use include all the data and intelligence—cost, financial, duration, performance or productivity, etc., that are needed to plan, organize, and control construction projects, as well as the company as a whole; and (4) managers and supervisors that are provided with such information are likely to make decisions that would help: (a) Reduce or maintain project durations; (b) make better use of resources; (c) increase labor and equipment productivity; and (d) decrease cost.

This study further revealed that:

1. Managers and supervisors in the 1980s will be distinguished by external and internal information supplied to him or her selectively and at his or her call in order to perform his or her functions more effectively and efficiently.
2. Construction companies do not often change information systems after undergoing changes in the organization.
3. Some construction companies buy packaged information systems without examining the functions and information needs of their personnel. Such companies eventually end up fitting the system to the needs of the user.

It is thus concluded from the findings that, since management functions and management information needs are inextricably linked, there is the need to redefine personnel functions, responsibilities and information needs after revising each organization structure.

Appendix.—References

1. Deatherage, George E. (1964). *Construction Company Organization and Management*, McGraw-Hill Book Co., Inc., New York, NY.
2. Donnelly, James H., Jr., et al. (1975). *Fundamentals of Management: Functions, Behavior, Models*. Rev. ed., Business Publications, Inc., Dallas, TX.

3. Drucker, Peter F. (1973). *Management: Tasks, Responsibilities, Practices,* Harper and Row Publishers, New York, NY.
4. Ewing, David W. (1964). *Long-Range Planning for Management,* Harper and Row Publishers, New York, NY.
5. Frein, J. P. (1980). "Functions and Organization of Contractor's Engineering Section," in *Handbook of Construction Management and Organization,* Joseph J. Frein, Ed., Van Nostrand Reinhold Co., New York, NY, Second ed., 195–260.
6. Kawal, D. E. (Nov., 1971). "Information Utilization in Project Planning," *J. Const. Div.,* ASCE, 97(CO2), Proc. Paper 8505, 227–240.
7. Melchers, Robert E. (Dec., 1977). "Influence of Organization on Project Implementation." *J. Const. Div.,* ASCE, 103(CO4), Proc. Paper 13436, 611–625.
8. O'Brien, J. J., and Zilly, R. G., Eds. (1971). *Contractor's Management Handbook.* McGraw-Hill Book Co., Inc., New York, NY.
9. Rossow, J. A. K., and Moavenzadeh, F. (June, 1976). "Construction Management Issues in the U.S. Construction Industry." *J. Const. Div.,* ASCE, 10(CO2), Proc. Paper 12184.
10. Tenah, K. A., *Intergrated Design, Planning and Construction of Building Works in Developing Countries Including the Role of Computers,* thesis presented to Stanford Univ., at Stanford, CA, in 1975, in partial fulfillment of the requirements for Engineer's Degree, 1–125.
11. Tenah, K. A., *Construction Management Information Control Systems (CMICS),* thesis presented to Texas A&M Univ., at College Station, TX, in 1979, in partial fulfillment of the requirements for the degree of Doctor of Philosophy, 19–38, 116–156.
12. Tenah, K. A., (May, 1981). "Management Information Organization and Flow in the Construction Organization," *Conference Proceedings,* Canadian Society of Civ. Engrg., NB, Canada.
13. Tenah, K. A., (Mar., 1982). "Construction Management Information Control Systems (CMICS)," *Proceedings of the Specialty Conference on Construction Equipment and Techniques for the Eighties,* Purdue Univ., West Lafayette, IN, 370–380.
14. Tenah, K. A. (Mar., 1984). "Management Information Organization and Routing," *J. Const. Engrg. Mgt.,* ASCE, 110(1), 101–118.