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Performance and Skill Level Requirements for Fire Support Teams

This research developed a Task Data Base for Fire Support Teams (FIST) and identified 48 tasks, grouped them into six functional areas, classified them as either procedural or semi-structured, and ranked them according to criteria of criticality and performance. The FIST Task Data Inventory resulted from the task analyses and integration of task descriptions and information obtained from questionnaires, interviews, and observations administered at three CONUS and four USAREUR divisions. Statistical analyses of the data indicated that (1) criticality and performance were negatively correlated, (2) procedural tasks were the least critical and best performed, (3) semi-structured tasks were the most critical and poorest performed, (4) task difficulty was the principal factor in ratings of criticality, and (5) traditional tasks were performed better than non-traditional tasks. The results of these analyses, and the utilization of the FIST Task Data Inventory, are discussed in terms of personnel and training assessments, simulation and training device recommendations, task analyses methodologies, and selection criteria.

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PERFORMANCE AND SKILL REQUIREMENTS FOR  
FIRE SUPPORT TEAMS

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The purpose of this research was to examine the needs and problems in manpower and training which have arisen during implementation of the Fire Support Team (FIST). The work was performed under Contract No. MDA903-99-C-9669 with the Army Research Institute, November 1, 1979, to March 30, 1981.

The FIST is a new entity which replaces the traditional forward observer by a team which is intended to provide wider coverage, greater mobility, and effective integration of improved munitions. The FIST consists of forward observer parties deployed with platoons to provide flexibility, mobility, and range, and a headquarters element at the company command post to provide integration, coordination, planning, and responsibility for the company's scheme of maneuver.

FISTs have been formed by training new personnel, by reclassification, and by assignment to the field. This process required reorganization and new development of training at both resident school and unit.

#### OBJECTIVES AND APPROACH

There were three objectives of study: 1) Specify the performance and skill level requirements for personnel assigned to FISTs; 2) Determine the degree to which performance and skill level requirements are being met, and identify the shortfalls which exist in manning, organization, equipment, and training of FISTs in the field; and 3) Project the probable impact that future field artillery systems will have on the performance and skill requirements for FIST.

The approach consisted of five tasks: 1) Develop a task data base for FIST; 2) Collect interview and questionnaire data from fire support personnel in fielded units in CONUS and USAREUR; 3) Analyze interview and questionnaire data for problems or deficiencies in performance, and training needs and contributing factors; 4) Estimate the effect of future weapon systems on job task and training requirements for FIST; and 5) Summarize FIST training and performance deficiencies, and make recommendations to correct them.

## DEVELOPMENT OF A TASK DATA BASE FOR FIST

A Task Data Base was compiled by integrating several sources; no single source provided an adequate list of tasks or adequate task data. It was necessary also to supplement this information by interviews with experts and by analysis. The printed sources of task-descriptive information were: Soldiers' Manuals FM6-13F 1/2 and 3; ARTEP 6-365 FA Battalion, 155mm DS; ARTEP 6-105 Battalion, 105mm DS; Training Circular 6-20-10 FIST, Task Analysis 13F, Directorate of Course Development DCRDT; Task Analysis, Close-Support Study Group II; Training Text 6-20-7, FIST/FAC Operations; and Weapon Systems Training Effectiveness Analysis - Forward Observer. The resulting list of tasks provided a comprehensive inventory of job tasks. It constituted a data base which was used to structure interviews, performance analyses, and training analyses in the later phases of the study.

The data on each task was summarized on a task description worksheet which contained the following categories of information: task number; duty (major functional area) to which the task belongs; task description; task assignment to positions within FIST, as indicated or implied by doctrine and as implemented in current field practice; task criticality rank and narrative evaluation of task criticality; references for task information; and listing of component subtasks, if applicable, and references to the source of subtask descriptions. These data were obtained by analysis of responses to a questionnaire and interviews. Functional flow diagrams were also prepared for nonprocedural, semi-structural tasks, or a set of related tasks, which were not amenable to description by a fixed sequence of subtasks or steps.

## COLLECTION OF INTERVIEW AND QUESTIONNAIRE DATA

Questionnaires were administered and interviews conducted among personnel of FIST units in the field, related fire support organizations, and commanders of maneuver units. The purpose of the questionnaire was to obtain information on the military occupational specialty (MOS) background of FIST personnel, nature of a company commander's experience with the FIST, and ratings of tasks on criticality and quality of performance by the FIST. The purpose of the interview was to obtain less easily structured information such as factors and considerations influencing a respondent's ratings and perceptions of the adequacy of training.

The questionnaire consisted of Background and Task Inventory sections. Different forms were used for FIST personnel and the company commander. For FIST participants it consisted of length of service, MOS, and military training history; for company commanders it consisted of the nature of their exposure to FIST concept prior to assuming a company command. The Task Inventory section was designed to obtain evaluations of each FIST task on five attributes: Task Assignment, in terms of the FIST member responsible for the task; Performance Rating from combat-ready to totally inadequate; and Task Criticality based on three estimates. They were: Task Difficulty (not difficult to extremely difficult); Consequences of Inadequate Performance (catastrophic to

none); and Detectability of Error (undetected to immediately detectable by the person committing the error). Criticality was not intended to reflect importance of a task but properties of tasks that are significant in determining priorities for training.

Only FIST Chiefs made evaluations on all five scales. FIST enlisted personnel responded to Task Assignment with a Yes or No to indicate whether they had performed that task in their assigned job and rated task difficulty; company commanders rated only performance and consequences of inadequate performance.

Interviews were conducted in three divisions in the continental U.S. and three in Europe. Questionnaires were administered to 86 and 137 persons in the U.S. and Europe, respectively; interviews were conducted with 67 and 94 persons. An interview protocol was prepared for each category of respondent to be used as a checklist of coverage to guide the interview. A primary concern was to allow the respondent latitude in his responses and comments and permit the interviewer freedom to follow up and elaborate on ratings and comments.

The results are organized into Task Data, Training, Personnel, and Organizational Factors.

#### FIST TASK DATA BASE

The information from the printed sources was combined with task data obtained by analysis of responses to the questionnaires and interviews. Forty-eight tasks were identified and grouped into six functional areas or duties. The functional areas and number of tasks in each are: I. Plan fires to support maneuver unit operations (9); II. Prepare/maintain/disseminate fire support information (6); III. Manage fire support communication system (5); IV. Manage use of fire support assets at maneuver unit level (3); V. Acquire targets of opportunity (4); and VI. Request/adjust fires (21). Information flow diagrams were prepared for some tasks and sets of tasks to depict the interdependencies among the tasks. They can be used as a basis to plan and operate simulations and training exercises for the purpose of integrating the component activities into an effective operation.

A set of basic skills too molecular to be components of tasks emerged as tasks were analyzed in greater detail. They are basic skills of fire support and are common prerequisites to mastering several tasks representing entry-level skills. The skills were grouped into the following six categories: Basic Forward Observer Procedures; Intelligence Reporting; Basic Map Reading; Basic Radio Procedures; Maintenance; and Basic Fire Support Procedures.

The tasks were also classified as procedural and semi-structured. Procedural tasks have a fixed sequence of steps or operations, initiating conditions and contingencies are known, standards of performance are known in the form of one correct response or outcome. They occur in established situations. Semi-structured tasks have a sequence of steps or operations which

varies depending on outcome of prior step, initiating events and conditions vary with situations, standards of performance are not known or determined, and multiplicity of appropriate responses exists. They occur in emergent situations. Current training technology is oriented predominantly toward procedural tasks while semi-structured tasks are new to the fire support community. They involve planning, coordination, and integration of fire support.

Mean performance and criticality ratings were computed for each task and the tasks were put in rank order. The ratings of the three criticality scales were combined to provide a single composite index of criticality. The relationship between the rank order of performance and criticality was estimated by Spearman Rho and found to be -0.67. Perceived level of performance declines as the tasks increase in criticality.

The tasks were divided into thirds on each dimension. The most critical and poorest performance (MC/PP) third and the least critical and best performed (LC/BP) third of the tasks were analyzed. The LC/BP tasks are procedural with one exception. The MC/PP tasks are semi-structured and procedural tasks on which FIST personnel get little practice or experience such as Request/Direct Close Air Support.

Task difficulty is the major factor of the criticality ratings. The partial correlation between performance ratings and task difficulty is 0.74 ( $p < 0.001$ ) controlling for the covariance with consequences of inadequate performance and detectability of errors. Comparable partial correlations of performance ratings with consequences and detectability of errors are 0.03 and -0.33 ( $p < 0.05$ ) respectively. The tasks for which errors are more detectable are performed better.

The correlation between the criticality dimensions indicate independence among these dimensions. They are: task difficulty/detectability (-0.22); task difficulty/consequences of inadequate performance (0.30,  $p < 0.05$ ); and detectability of errors/consequences of inadequate performance (-0.33).

## TRAINING

Resident school training is viewed as good and unit training as poor. Training courses provided at the Field Artillery School in Officer's Basic, Cannon Battery Officers', Basic NCO, and Advanced Individual Training are good. However, they focus largely on the procedural tasks; less proceduralized tasks in planning, coordinating, and integrating fire support are not adequately covered or exercised. Unit training programs are not adequate in FIST participation in field exercises for maneuver units, unit training for FIST, and reclassification training.

The characterization of unit training provided by the survey is represented in the following responses. Seventy-three percent of enlisted respondents in CONUS and USAREUR reported that MOS unit training is not sufficient to become proficient at one's job and skill level. Over half the

respondents cited training shortfalls as a major source of performance deficiency. An average of 9-2 hours/week of scheduled training activity while in garrison was reported by 60% of USAREUR respondents; CONUS observations were similar. Deviations took the form of "crash courses" prior to SQT and ARTEP times. Seventy percent of CONUS/USAREUR reclassified respondents reported no transition in unit other than OJT.

The training methods reported as currently used to train in support planning consist of: the FTX (Field Training Exercise), consisting of ARTEP, REALTRAIN, and GDP Areas Walks; the CPX (Command Post Exercise) consisting of CAMMS, Battle of Eiterfeld, and Dunn Kempf; and classroom lectures. The typical USAREUR annual FTX training consists of supporting one battalion ARTEP, one three-week REALTRAIN exercise at Hohenfel MTA, and one/two GDP terrain walks. Factors limiting the value of the FTX in USAREUR are the severe constraints on field maneuver, physical separation of units up to 100 KM, no feedback on effect of fire support planning, unrealistic representation of time constraints and availability of assets and nonrepresentation of multiple information sources.

The value of the CPX for FIST is compromised by limitations of the simulation. Fire support planning is infrequently exercised. CAMMS is the most commonly used but the company level and FIST are not exercised in CAMMS. The Dunn Kempf game, a company level simulation, provides training for FIST HQ and the FO team, but with mixed results. It has questionable validity of weapons effects and requires excessive time to learn rules and to prepare/set up/run. The Battle of Eiterfeld designed in December 1979 to meet FIST needs has not yet reached the field units.

One good program exists in 8th Infantry DIVARTY. It is a three-phased program progressing from classroom instruction through CPXs to a combined arms exercise in live firing. The phases are: 1) Four concentrated hours of class on fundamentals of fire support planning; 2) Three series of Dunn Kempf gaming exercises played; and 3) Combined arms live fire exercise and evaluation.

The principal conclusions concerning unit training is that the FIST needs a separate exercise capability designed to meet its training needs which can be used to provide frequent training experiences. It also needs the resources and autonomy to manage its own training and development of its personnel.

#### PERSONNEL

A summary of FIST personnel factors is: FISTS in the field are understaffed or staffed with underqualified personnel in numbers, grade levels, training, and experience; there is a potential problem of retention; and personnel authorizations may not be adequate in experience and depth to sustain prolonged performance.

Manpower shortfalls exist in both enlisted and officer ranks. Enlisted ranks are operating at 65% of authorized strength ranging from 38% to 86%. The E7 grade showed the most marked shortfall. Officer ranks are operating at 60% of authorized strength, ranging from 46% to 93%. The Brigade FSO position is rarely filled by an O4 grade; the O3 grade was only slightly more common in the Battalion FSO positions. The pool of FIST lieutenants was significantly understrength. FIST personnel are routinely forced to perform in job positions intended for higher grade/rank and more experience. FISTs are routinely sent to the field with less than a complete crew in number, MOS qualification, and grade/rank.

There is a credibility problem for the FIST in many units. Many company commanders do not value FIST or know how to use it, and do not treat it as part of the command team. A similar gap exists at the level of FO team and platoon leader. Since deployed FISTs are only a partial implementation of the doctrinal concept and company commanders routinely see reclassified E5s/E6s as FIST chiefs, limited use of the FIST chief as fire support coordinator is a safer course.

Most reclassified FISTs come from MOS related primarily to forward observer positions. Few reclassified FIST members have had reclassification training. Thirty-seven percent of the E1-E5 personnel reported lack of expertise among 13F NCOs as a major impediment to training.

Common sources of dissatisfaction in MOS 13F are that they routinely work in a "shortage" environment and are required to perform in jobs for which they have not qualified. Further, capable, undergrade FIST personnel often express frustration at being underutilized and unappreciated. The field artillery battalion is still focused on guns and the fire direction center. Career and training needs of the 13F specialists are often subordinated to priorities of firing batteries.

#### ORGANIZATIONAL FACTORS

There are needs for greater self-sufficiency for FIST in managing its own training, resources, and personnel, and to emphasize a forward-looking rather than reactive role in the management and integration function of FIST. There is doubt that the present FIST implementation provides sufficient resilience and flexibility for operation under emergency or degraded conditions.

Eighty percent of FIST officers and enlisted respondents in USAREUR and 90% in CONUS expressed dissatisfaction with current FIST utilization. Perceived misuse of the fire support section within battalion often was cited as a major impediment to training. The fundamental problems faced by fielded units are effective integration into the battalion organization, lack of an MOS-experienced 13F NCO pool, and lack of time due to excessive support details. Eighty percent of FIST reported this misuse of the FIST as a serious factor. Three alternatives proposed to organizing the FIST were: attach all

FIST personnel to the firing battery; attach some or all FIST lieutenants to the firing batteries with FIST enlisted personnel remaining in the HQ battery; and consolidate all FIST officers and enlisted personnel in HQ battery under the Brigade FSO.

#### IMPACT OF FUTURE SYSTEMS ON THE FIST SUPPORT TEAM

A summary of the implications of future systems for FIST training must emphasize the following points. There will be an increased complexity of HQ tasks in fire support planning, management of fire support resources, and support to scheme of maneuver. They are the semi-structured tasks which are the less well trained tasks at the present time. They are the more difficult to train and require "hands-on" exercises as a necessary method. Training will require greater use of simulation, modeling, and war gaming in training devices and programs. These methods are costly and not mature technologically. Future systems will have a lesser effect on the functions of the forward observer.

Recommendations for research and development were made in three areas: Need for more knowledge and better understanding of FIST as a team, its performance, and the workload imposed by various combat scenarios; need for improved training materials and delivery systems; and improved retention in the 13F MOS.

