CHAPTER IV

TIME TWO: TASKS

In this chapter the emergency tasks of public works personnel are described. The typology of organizational response to disasters introduced in chapter one is incorporated in this discussion. The use of this analytical device will provide a framework in which the similarities and differences of response among public works employees can be more clearly described than would be possible following the formal structural divisions outlined in chapter two.

Thus, public works personnel are here discussed in three functional categories. The breakdown follows a typology which will be discussed in detail in a later chapter. However, to give readers an indication of focus, table 1 abstractly depicts, according to their structure and tasks, the four major types of organizations or groups involved in the typology.

TABLE 1

TASKS

STRUCTURES	Regular	Nonregular
Established	Type I	Type III
Emergent	Type II	Type IV

According to our analysis the functional units of the public works organization fall into the following parallel cells:

Maintenance personnel	Engineering personnel
	Emergent engineering group

Following a description of the engineering personnel, whose Time Two (figure 3) characteristics approach the Type III organizations of the typology, the tasks of the maintenance personnel are considered. These public works personnel correspond to the typology's Type I organizations which

include among their normal activities certain preparations for emergencies. Finally, the service and administrative personnel are considered. This portion of the chapter includes a discussion of the customer service section of the water division, the sanitation section of the division of maintenance, and the administrative and office personnel of the public works. The place of these service and administrative groups in the typology formulation is somewhat ambiguous and this ambiguity is considered in detail in the last chapter of this monograph.

As was indicated in chapter one, the emergent engineering group (which would fall under the Type IV classification of the typology), is discussed within the context of the engineering personnel. No consideration of that group as a peculiar type will be presented until chapter six of the monograph. Similarly, the principal distinguishing characteristic of the maintenance and engineering groups as Types I and III respectively will be discussed in the final chapter.

Engineering

The engineering function of the Anchorage Department of Public Works places the highest priorities on tasks associated with the design and construction of municipal structures, streets, and utility systems. The division of labor is officially defined by the very structure of the engineering division, i.e., by the distinctions among the survey, design, construction, and maintenance sections of that division. The personnel of these sections may be said to participate successively in the completion of tasks. Beginning with the survey of possible locations and the drawing of designs and specifications, the tasks progress through the letting of contract and supervision of the actual construction to, in the case of public buildings, periodic inspection and regular maintenance. With the exception of the latter tasks, the process is largely self-contained, that is, it does not overlap significantly with the maintenance function of the public works.

Traffic engineering serves a similar, and almost as total function, in a more limited area of public facilities. Described in chapter three, the tasks of this division of the public works range from the design to the maintenance of signals and other devices associated with traffic control in the city. The other engineering division, building inspection, has purely regulatory tasks, as it is charged with the supervision and control of all construction and alteration undertaken in the city.

Given these normal task priorities, the personnel engaged in survey and design were affected by the earthquake only indirectly. Their principal contribution to the disaster effort came considerably after the emergency period when, together with the Army Corps of Engineers, they began the massive job of reconstruction. Those personnel in the engineering divisions assigned to inspection, and especially to condemnation procedures, were more immediately involved after the earthquake. But the most immediate demands were placed on those who were less engineers than maintenance and repairmen, i.e., certain members of the building construction and maintenance section.

For many employees of the public works, particularly those in supervisory positions, the simplest operational priority, under which they can place all of their specific tasks, is "public service." Thus, during the immediate emergency period, supervisors responded to the situation in terms of this general definition by taking on new tasks to replace normal activities made irrelevant by the disaster. They would not have performed these new tasks in normal times, but in this unusual circumstance, these tasks were seen as necessary to protect the public and its property and to restore vital community services. As a result, considerable discontinuity between Time One and Time Two tasks existed for these engineers; their disaster tasks often bore little resemblance to their normal responsibilities. For other members of the engineering division, all continuity was lost and they were apparently left with no relevant task priorities at all.

Survey and Design Sections

That the highest priority following a disaster is placed on the preservation of human life and essential services is suggested by the immediate activities of the heads of the survey and the design sections of the engineering division. The head of the design section, for example, became involved in transporting medical supplies to one of the Anchorage hospitals. His counterpart in the survey section, although he probably knew as much about radio electronics as the head of the design section knew of medicine, found the necessary help and took an emergency generator out to the remote transmitter which had lost power as a result of the earthquake. These activities were undertaken, not because either of the men was prepared by experience or training, but simply because the tasks had to be done.

During the following two days of the emergency period the men were somewhat less out of their element, but still had not returned to Time One tasks. On Saturday the head of the design section worked with a group of geologists who were assessing the land movements in the city. And on Sunday he and his assistant organized four-man teams and joined in the damage survey of the sewer system. The head of the survey section had begun this same process independently on Friday night, and by Sunday he had some ten men working under his direction. The availability of city utility maps in his office apparently increased to some extent the efficiency of his operation, but the personnel involved were not necessarily experienced in the work. It was said:

> Occasionally /we'd/ been able to pick up somebody else around that was not overly busy. . . . Well, we'd go out and bang away at it. We went around drawing these lines on these maps. If I saw a manhole that I could get at easily, why, I'd bang it open and I'd note whether the sewer was flowing or not flowing.

The design and the survey heads were each aware that they were not working alone in checking the sewer system, but neither was certain during the two days of the emergency period exactly who else was involved.

> There were other people doing it, /one man realized/, that was obvious -- in fact, some of the manholes had been opened. But it was a matter of a day or two days before I was aware of who was operating.

The additional teams were from the maintenance division, which by normal task priorities and experience in the public works was officially charged with responsibility for the sewers. This duplication of efforts during the emergency period will be discussed in more detail in the next chapter.

No one told the design or the survey head to perform these tasks. The inspections and other jobs they undertook were impromptu but necessary activities at the time; the two engineering heads continued to perform them until it was clear that other members of the public works, more adequately prepared, were capable of taking over completely. But for other members of these two engineering sections the imperative to act was somewhat less categorical. Two of these employees said that they heard a radio announcement urging the public not to attempt to reach downtown Anchorage; they did not. They reported to work on Sunday. Another employee, who arrived at his office Friday evening, saw one of the head engineers who told him there was nothing to do. He went home until called back to work Sunday afternoon. Another engineer worked for three or four hours the day after the earthquake, assisting in the location and checking of gas valves. He returned home that afternoon and did not report for work until Monday morning, a day and a half later. Given the irrelevancy of their normal tasks to the activities of the emergency period, these engineers probably defined themselves as unnecessary members of the public works during this period. Supervisors, on the other hand, typically operate under comparatively general job descriptions which may have contributed to their willingness to take on totally new tasks. In any case, as official leaders they probably felt they should be present.

Traffic Engineering Division

The normal tasks of the members of the traffic engineering division, like those of the survey and design sections, were not required during the emergency period. Indeed, the head of the traffic division was with the National Guard at the time of the earthquake and served in the organization through Saturday morning. The only immediate physical action taken during the emergency by the division was the removal of downtown parking meters and traffic signals, particularly those which were hazardous to public safety. At the same time, a survey of the damage to the traffic control system was undertaken, but only on the following Monday were any actual salvage operations or repairs begun by members of the division. The assistant traffic engineer worked Saturday morning, supervising the placement of barricades around slide areas which the Army had not yet cordoned off. He did not return to work again until Monday morning because there was nothing for him to do as a traffic engineer.

Construction Section

After some immediate work Friday night in providing emergency power for certain "key organizations," the head of the construction section of the engineering division began organizing the equipment pool, a project which was to occupy him throughout the emergency period. This was to be the major source of heavy equipment during the disaster operations. It was set up in a strip of municipal park at 9th Avenue and C Street, four blocks southeast of the City Hall Annex. From this point, trucks and other equipment loaned, borrowed, and donated by private contractors and state agencies were dispatched. The head of the construction section served as supervisor of this equipment center during its operation. Like the heads of the survey and design sections, he took on this task because it needed to be done. But he was better prepared for his new job than his colleagues were for theirs.

> /He/ was probably in a better position than anyone in the city to know where this equipment was because /he/works with these people all the time. . . . /ile has/ a list of contractors' emergency numbers and knows how to get a hold of these people. So usually anyone that needed a piece of equipment that wasn't available would call /him/ and /he/ would line them up on where to get it or make an effort to get it for them.

The construction section head also became involved in the sewage system operations, not in the inspection and damage assessment, but in the emergency repairs which were tentatively begun the day after the earthquake. This work, like supervision of the equipment pool, was linked with his Time One activities by his knowledge of private contractors in Anchorage. Much of the emergency work on the sewers was, in fact, done by local contractors. They worked on a semivoluntary basis as contracts obviously could not be drawn up at the time of the emergency; they were, however, subsequently reimbursed for their services. Because the head of the construction section knew the contractors, he was an important source of contact with them for the public works during this period. He, together with the head of the survey section and the sewer foreman of the maintenance division (a position created during the emergency period) shared the responsibility of coordinating the immediate repairs to the sewer system. The head of the construction section took charge of the work done by private contractors, leaving the supervision of the public works crews to the maintenance foreman, and the inspection of the system to the heads of the survey and design section.

Building Construction and Maintenance Section

The head of the building construction and maintenance section also enlarged the scope of his normal activities to include a number of new tasks demanded by emergency. The most immediate of the new tasks was search and rescue, a necessary activity which, however, is normally not the concern of any one group, at least on a large scale.[1] Those who participated in this

activity were provided with police department symbols, armbands improvised from torn-up sheets with "police" written on them.

Through these emergency activities the head of the building construction and maintenance section emerged as the coordinator of a variety of disaster operations during the weekend of the earthquake. He emerged, in fact, as the head of a new and almost completely independent group which detached itself from the public works and stood somewhere between that department and emergency organizations such as the police. Unlike the supervisors of the other engineering sections who, although they assumed new tasks, continued to operate with their colleagues in the public works, the head of the building construction and maintenance section took on broad information-gathering and coordinating tasks which placed him outside the context of the public works. Those who made up the core of this new group -- variously self-labeled as the "Disaster Desk," "Damage Control," and, most frequently, the "Disaster Control Office" -- were drawn from the building construction and maintenance section and from outside the public works altogether.

During the first night of the emergency, this group organized and dispatched search-and-rescue teams which checked for trapped persons, secured buildings, and began the process of removing hazards from damaged buildings. Before the emergency period was over, the Disaster Control Office had expanded its activities to include the dispatching of both light rescue and heavy duty demolition and security teams, the operation of a transportation pool, the beginnings of an equipment depot, the establishment of three shelters for those made homeless by the earthquake, and the development of a central office gathering and providing disaster information. The group also commandeered a service station across the street from the Public Safety Building, dispensed gasoline, and made tentative steps in the direction of providing for emergency water and sanitation facilities for the Public Safety Building. One member of this new group said:

> I remarked sometime Saturday morning that I had never done such a variety of things in such a short period of time. And we all did. We wore as many hats as we could possibly get on our heads.

The Disaster Control Office began with the personnel of the building construction and maintenance section, but during its brief existence, it absorbed not only several hundred volunteers (estimates ran as high as seven hundred) but also two established rescue groups -- one associated with the Army and the other a civilian mountain-climbing group. Within the public works, the Disaster Control Office incorporated the personnel of the building inspection division, including the head of that division. The core of the new organization, however, remained the members of the building construction and maintenance section plus an additional four persons from outside the public works who were friends of the head of that section.

Despite the great range of activities undertaken by the members of the Disaster Control Office, there was one which emerged as basic to all their operations. This most important single function was coordination. In the

absence of any clearly defined emergency coordinating body, the members of the Disaster Control Office assumed that task and, as a consequence created a totally new organization.[2] The coordinating task which they assumed involved not only the various sections of the public works, but also virtually all other municipal and private groups which responded to the disaster. Thus, the Disaster Control Office took on the task of coordinating interorganizational as well as intraorganizational activities. No plans existed before the earthquake to suggest that the building construction and maintenance section should assume this task. The process was, to that extent, "natural." One member of the section suggested that what they did was different only in degree from the activities of other engineers. He described the situation this way:

> All of the unit heads came /to work/ of their own volition because they thought, "Well, you know something's got to be done. Here I am. Let's go." They were not told what to do; they were not directed. They had no standing orders to report. But they just reported and then carried on. /This was/ especially true in this damage control unit. . . . What we did was probably the regular assignment of the civil defense, and in their absence we moved out and did it.

Nonetheless, the head of the building construction and maintenance section could see some continuity between his normal responsibilities and those he assumed during the emergency. Like the head of the construction section, whose normal associations with private contractors provided him with valuable information concerning available resources outside the public works, the building construction and maintenance head felt that his Time One assignment to "buildings and structures" had prepared him for the tasks he took on at Time Two. In the following statement these new responsibilities were described by a member of his section.

> We were operating with some degree of efficiency and I'll say that this damage control group was probably operating more decisively than anyone else with the exception of the utilities. . . . /We/ don't fit into the normal routine of public works things: /We/ have nothing to do with street work, storm drains or sewers or anything like that, but /are/ fully concerned with buildings and structures. So this was a sort of natural thing for /us/ to do. /We/ seem to be able to just grab hold where there are loose ends . . . and that's what /we/ did.

The difficulty of some engineering personnel -- especially those not in supervisory positions -- finding something to do in a situation which made their normal tasks irrelevant was not characteristic of the members of the building construction and maintenance section. With the exception of the head of the section, all the employees were maintenance men rather than engineers. Their maintenance and repair responsibilities (for plumbing,

heating, carpentry, and the like in public buildings) were easily transferred in the emergency to any building which had been damaged by the earthquake. Apparently there was little ambiguity for these men in defining their extended responsibilities. Each of the repairmen in the section became, according to one respondent, a foreman in charge of a team of volunteers, working efficiently and independently, much as they had done in Time One. For other personnel of the engineering division, demands for normal activities -- for copies of utility and street maps, assistance in survey and inspection projects, for example -- were not felt immediately following the earthquake. Not until Sunday and Monday were the office tasks which were normally performed by many of these men required and, in the interim, there was nothing for them to do.

In terms of its tasks and of its personnel, the building construction and maintenance section was not an engineering unit. It was, instead, maintenance oriented, an orientation immediately relevant to the disaster. The normal tasks of the members of the division of building inspection, too, were quickly transferable to the disaster environment. The Time One experience of the personnel of this division provided them with skills which were immediately useful in the search-and-rescue operations. As a result, members of this division became members of the Disaster Control Office and were coordinated by the head of the building construction and maintenance section.

Maintenance

The contrast between the Time Two tasks of the engineering and the maintenance divisions of the public works is suggested by a pair of statements frequently repeated by members of these divisions. Describing what they did during the emergency period, engineering personnel were likely to say: "We saw what had to be done, and we did it." Personnel in the maintenance sections, however, significantly altered their version of this comment. "We knew what had to be done, and we did it." This change points to the major source of variations among the sections of the public works, not only in Time Two tasks, but also in patterns of authority, decision making, and communication during the post-disaster period. Engineers generally took on new tasks; maintenance personnel simply continued with their normal tasks. More properly, the effects of the earthquake demanded qualitative changes in the tasks of engineering employees, but only quantitative changes among the maintenance sections. In this sense, it may be appropriate to call the earthquake a "disaster" for engineers, but an "emergency" for the maintenance. Further discussion of this distinction will be presented in chapter six.

Those sections of the public works which are normally assigned maintenance functions include the general maintenance and equipment maintenance sections of the maintenance division, the treatment plant and maintenance sections of the water division, and the personnel of the division of airports. The personnel of these sections are responsible for the maintenance and repair of city streets and sewers, of trucks and other mechanical equipment owned by the city, of the water treatment and distributive systems, and of the city-operated air field. These public facilities were most seriously damaged by the earthquake and, particularly in the case of the streets, sewers, and

water systems, these facilities are defined as "essential" to the welfare of the community. For the personnel of these sections, then, the effects of the earthquake created demands for tasks which were both continuous with Time One and ascribed high priority by the community during the emergency period. The result was relatively rapid mobilization within these sections and immediate attention to familiar tasks.

General Maintenance Section

For members of the streets crews -- the maintenance men, the three foremen, and the general foreman -- the task of opening streets blocked by debris and disrupted by the ground dislocations began during the hours immediately following the earthquake. The work done on Friday night, however, was somewhat uncoordinated. Men available and experienced in the operation of heavy earth-moving equipment were dispatched, or, in some instances, simply took upon themselves to open city streets they knew were blocked. Other members of the crews helped the police set up barricades around the most heavily damaged areas. Early the following morning, with crews considerably augmented by volunteers from private contractors and with additional trucks and other equipment donated by the state department and local construction companies, the street repairs began more systematically.

The impetus for the emergency repairs was the threat of fires -- a threat which never materialized, but which required the temporary construction of fire lanes against the possibility. The repairs were accomplished by leveling the outcroppings and filling the depressions with gravel. By the Monday following the earthquake the emergency repairs were completed; only certain faults had to be refilled as a result of the packing and settling of the gravel. Streets were most severely damaged in the downtown areas of Anchorage and in the Turnagain residential section, and these received the immediate attention of the street crews. The massive project was completed in two days, largely because the ranks of city personnel were swelled to one hundred by construction workers from private businesses. Estimates of the amount of equipment volunteered for use in these repairs vary, but apparently something like sixty-five or seventy trucks and about ten loaders were added.

The general foreman assumed the initial responsibility for dispatching the city crews and the volunteers, but later delegated this task to one of the street foremen. When the latter was placed in charge of the sewer repairs on Sunday, the foreman of the sanitation section took his place as dispatcher. The other two street foremen were in the field, one directing the operations at the gravel pit, the other at the areas under repair. These foremen were joined by three of the leadmen from the street crews who were promoted to the position of foreman during the emergency period. The gravel-fill operations were begun at five o'clock Saturday morning; the men worked from that time, both Saturday and Sunday, until dark, and the completion of this project by Monday coincided with the end of what has been called the "emergency period." Comparing the work undertaken during these two days with the tasks of Time One, a member of the general maintenance section said, "Well, there was just an awful lot more to do. I'd say a hundred times more

to do than we would ever run into in any normal maintenance day." And, making the same observation of quantitative change in task demands, one of the street foremen suggested that during the emergency period he was faced with the "same work, only a lot more of it."

In addition to their normal tasks of maintaining the city streets, members of the general maintenance section are also responsible for the operations of the sewer systems in Anchorage. Normally, the maintenance of the storm and sanitary sewers is delegated to the crews by their assignment to sections of the city, each of the three foremen and their men being responsible for streets and sewers in one part of Anchorage. Considerable duplication occurred, however, in the inspection of the sewage systems immediately following the earthquake. The supervisors of the survey, design, and to a more limited extent, the construction sections were all involved in the initial stages of this project and, until Sunday afternoon, little coordination existed in their activities.

The general maintenance foreman, who had been made the nominal supervisor of all sewer activities in his section only a month before the earthquake, dispatched men on the gravel haul until Sunday afternoon. At 3:00 p.m., however, he, together with the general foreman of the maintenance division and the director of public works, met to discuss the situation. It was suggested, apparently in an attempt to bring some order to the inspection and restoration of the sewage systems, that the sewer foreman should take operational charge of all activities and personnel associated with that project. This new authority, however, did not preclude the assistance of public works personnel from outside the general maintenance section. At the request of the sewer foreman, the head of the construction section became more actively involved in this project than he had been.

To a certain extent, the initial difficulty in coordinating sewer inspections and the necessity of calling in outside help once coordination was established were both functions of the sewer system itself. The sewers required extensive inspection and mapping before breaks could be located and appropriate temporary repairs made. In a paper describing this inspection and repair process, two consulting engineers hired by the city made the following comparison of the difficulties in assessing the damage to the sewage and water system.

> The location of damage and the delineation of repair methods for sewer restoration was a project of more complexity than was the case with the water distribution system. Damage to sewers was not confined to slide areas, nor was it obvious at the ground surface as was often the case with water main breaks. In order to define the location and nature of individual line breaks, photographic and direct visual inspection of the sewers was required.[3]

These difficulties were compounded by the absence of complete maps of sewage-system connections and installations, some of which had been built by private contractors for housing developments and only purchased by the city later. The early inspection work, as a result, was largely improvised and was necessarily somewhat haphazard. The early difficulties in coordination and the changes in authority which followed the official appointment of the sewer foreman will be discussed in greater detail in the next chapter.

Equipment Maintenance Section

Of the equipment maintenance section, as it had of the general maintenance section, the emergency demanded a quantitative rather than a qualitative change in tasks. Despite the increase in the number of vehicles which they serviced and repaired -- all private equipment used on city projects were fueled and maintained by the city garage -- the number of section personnel were sufficient to handle the extended tasks. Only three additional persons were involved in emergency operations: three boys who volunteered to help restore the parts room to order. Time One personnel handled the increased work load by extending shifts to twelve or fourteen hours and by adding a third shift to provide twenty-four hour service. More importantly, only limited repairs were made to keep equipment in the field, and certain jobs which, during normal times, were distributed among several members of the section, were telescoped and assigned to one man.

Highest priority during the emergency period was on meeting the demands of the immediate situation. Whatever had to be done to keep equipment working, no matter how unorthodox, was done. Thus, one member of the section described how some of the disaster contingencies were met.

> If you had a piece of equipment -- a grader that had a major breakdown which was impossible to repair without parts -- we would rob the good parts off it to keep the other machines going. . . . We had four or five graders; we just switched parts back and forth, back and forth for a week. . . . We had to keep borrowing batteries here and there and switching everything around which you don't normally do. The water trucks were all out of batteries, so I had to go up and get out all the old equipment and get enough batteries just to get the four tankers up there to stand by for the fire department.

Ordinarily the extra parts would have been available from local suppliers or could have been borrowed from other organizations in the city, like The Alaska Railroad or the state department of highways. But the earthquake had disorganized and isolated these sources as it had the equipment maintenance section. It was reported:

> Most of the local parts houses were damaged and we couldn't find the parts. You could get the parts

> there, but they were having as bad a time as we were. Some of them were a lot more damaged than we were. We dug around in the parts room half of the time trying to find stuff -- patching up jack hammers that had broken down. . . . Normally you just order the parts or you have a spare, but at the time we handed those out we didn't have any spares to use. So what we did have we had to keep going. If it meant putting diesel fuel in a gasoline engine or gas in a diesel engine, we'd do it.

Additional equipment available during the emergency period, especially trucks donated by private contractors, made it possible for the equipment maintenance section to ignore major repairs which during normal times would have been given a high priority. There was generally enough working equipment left to replace any which needed extensive repair.

> Anything major we didn't bother with, we didn't have time. If they had a major breakdown, they'd just park their truck and you'd go up to the equipment pool. There was always another one available.

To help facilitate street repairs and to make the best use of the time available (from five or six in the morning until dark when the damaged areas were sealed off by police and the Army) members of the equipment maintenance section did most of their work in the field. Refueling and minor repairs were done wherever the equipment was being worked. Generally one man was dispatched to do both. A maintenance man commented on this double duty:

> A lot of that stuff needed monkey-wrenching /as well as fuel/ and so rather than come back to the garage and get a mechanic and go out there, why, you could do that too.

Thus, major differences between the tasks of Time One and Time Two were that work was largely done in the field during the emergency period, an infrequent practice during normal times, and that the division of labor of normal times was often ignored during the days following the earthquake. Only on Friday night, immediately after the disaster, did men of the equipment maintenance section engage in totally different tasks, helping with the search-and-rescue operations and with the restoration of power and water to public buildings.

Their knowledge of welding equipment and emergency generators, and the fact that this equipment is stored in the city garage help to explain their participation. Beginning on Saturday morning, however, there was considerable continuity between the tasks of Time One and Time Two for the members of this section. They were not called upon again to perform wholly new tasks. Indeed, one of the maintenance men suggested that, overall, he was probably less busy during the emergency period than he would have been during normal