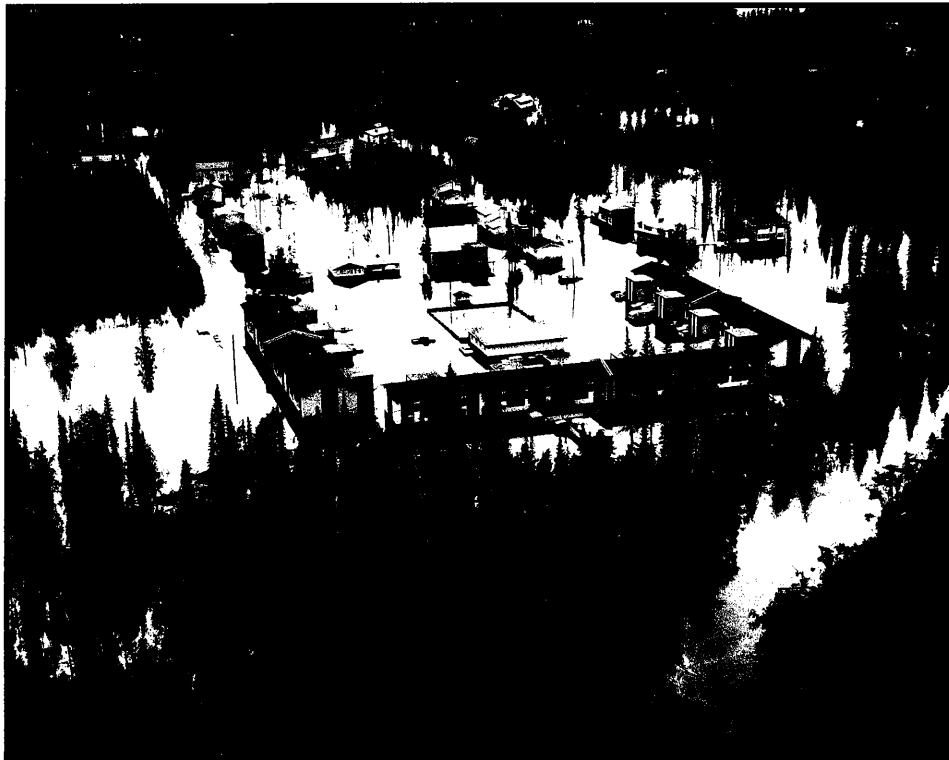




THE GOOD FRIDAY EARTHQUAKE AND CHENA RIVER FLOODS

During the 1960s, two disasters increased the prominence of the Army Engineers in Alaska: the Good Friday earthquake in the South Central region of the state, and the Chena Flood near Fairbanks. The Corps' assistance to the military and civilian populations of Alaska in the aftermath of these emergencies earned the agency nationwide praise and commendation.





VII. RESPONSE TO DISASTERS

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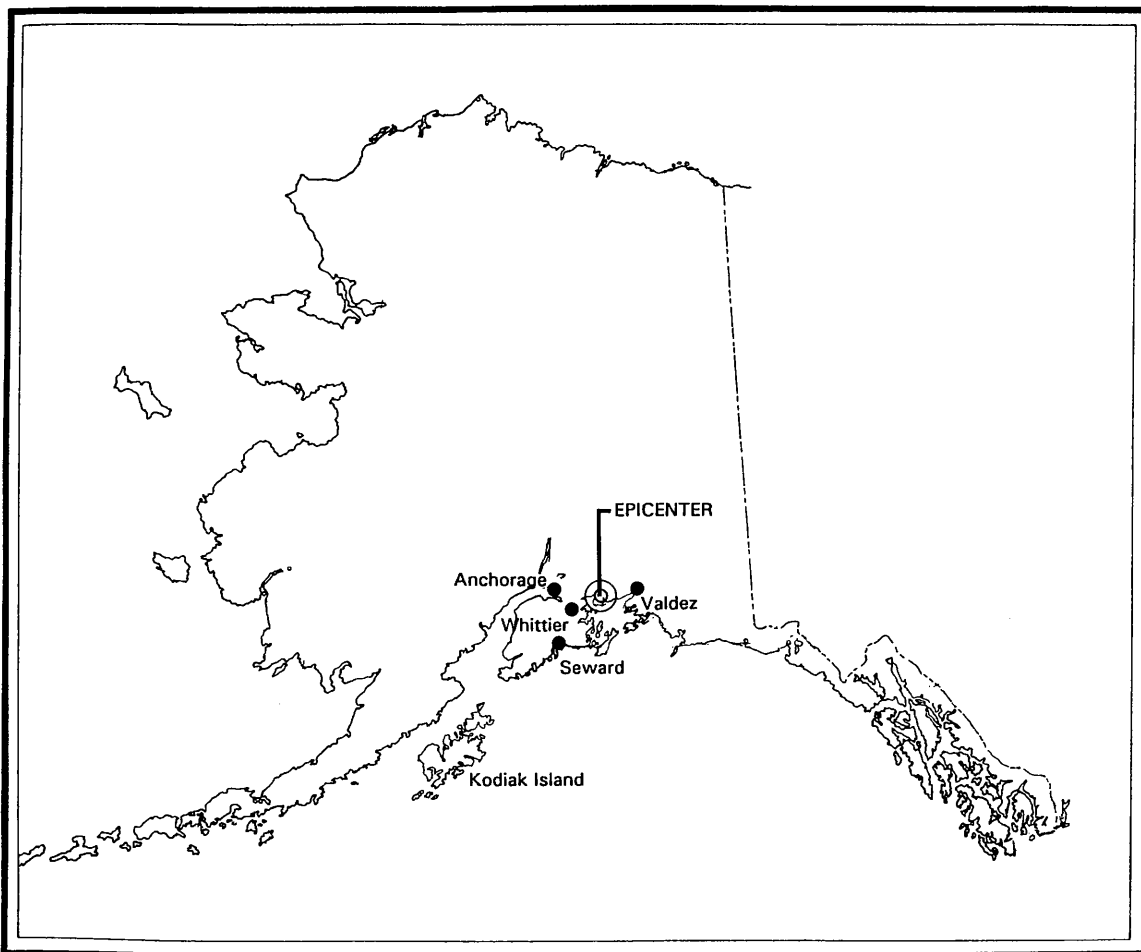
THE ALASKA EARTHQUAKE

On Good Friday, March 27, 1964, many Alaskans were preparing for the Easter holiday. Schools were not in session and most businesses closed early. Spring had just arrived, and people were betting on when the ice would break up in the rivers — an annual pastime that marked the end of winter.¹ At 5:36 p.m. the greatest earthquake recorded in North America struck the South Central section of the state. This disaster prompted a joint military-civilian effort at rescue and reconstruction that was unparalleled in Alaska's history.² The Army Engineers' work included providing emergency relief, clearing debris, restoring public facilities, gathering scientific data, and conducting interviews with survivors. So significant was the experience gained by the Corps and other agencies involved in the recovery efforts that it strengthened the nation's ability to respond to earthquakes and other disasters.

Earthquakes occur frequently in Alaska, especially along the "Ring of Fire," which runs through the Aleutian Islands to Cook Inlet and Prince William Sound,

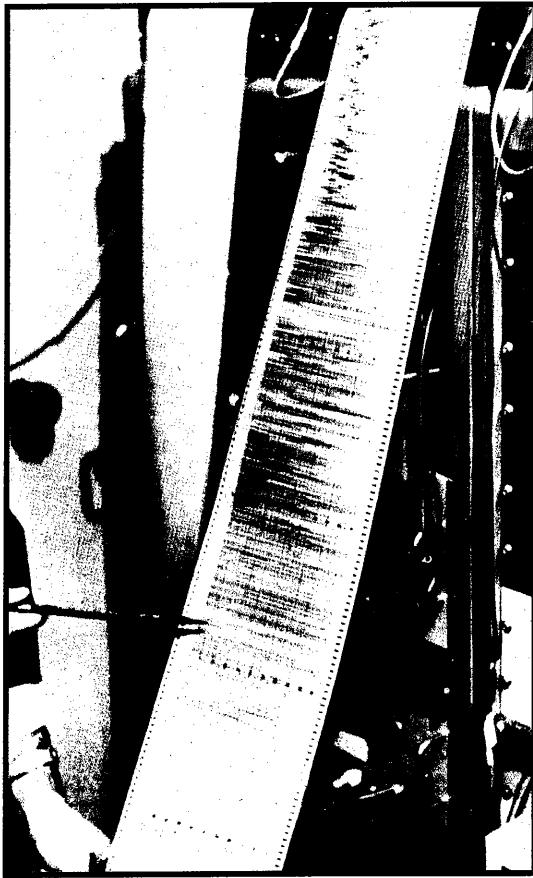
VII. RESPONSE TO DISASTERS

down the Panhandle to the west coast of Canada and the United States, and to the Pacific coasts of South America and Japan. Earthquakes are oscillatory, sometimes violent movements of the land surface that follow a release of energy in the earth's crust. These movements generate seismic waves that travel from the epicenter to distant places at varying speeds. The Richter Scale measures the earthquake's magnitude, which includes the amplitude of seismic waves and the amount of energy released. The Richter Scale is logarithmic, and a recording of seven indicates a disturbance ten times as large as a recording of six. While large earthquakes are common in the Aleutian Islands, their remoteness and lack of population centers prevent widespread damage. The Good Friday earthquake, however, affected an area where much of Alaska's population had concentrated. This disturbance, which registered 8.2 to 8.7 on the Richter Scale, was devastating in magnitude, causing a catastrophe that many Alaskans remembered vividly three decades later.³



Alaska earthquake.

People detected the Alaska earthquake as far away as Key West, Florida — 4,000 miles from its epicenter. When the shaking began, some residents of the Far North, accustomed to earthquakes, thought that it would end quickly.⁴ Elmer Shaw, a Resource Utilization Specialist with the Bureau of Land Management, immediately recognized the severity of the earthquake. “It was more violent than the others,” he explained. “I had a feeling that the whole earth was coming to an end.”⁵ Residents estimated that the disturbance lasted between three and five minutes, and some recalled a “rolling feeling rather than abrupt, hard jolts.” So violent was the motion near the epicenter that the tops of trees snapped off.⁶ Throughout the next month, 1,000 aftershocks hit the area.⁷



This seismograph in Pasadena, California, recorded the Alaska earthquake. In contrast, a straight line in the middle of the graph indicates “earth at rest.”

Erwin Long, an engineer in the Corps’ Foundations and Materials Branch, was visiting a real estate company in Anchorage when the earthquake struck. “I looked behind the desk in the office there,” he remembered, “and saw concrete block walls and immediately decided I didn’t know whether they were properly reinforced or not, and it seems like the next thing I knew I was outside hanging onto the telephone pole. I don’t know what happened in between.”⁸

Anchorage, located about 80 miles west of the epicenter of the earthquake, sustained the heaviest property damage. Here the earthquake caused a number of slides, which were especially severe in Turnagain Arm area along Cook Inlet. Elmer Shaw observed that “what had one time been high, dry land was now mushy tide flats with salt water seeping up through the TV antennas even.” Houses and cars were turned upside down, some of them sliding several blocks into the water.⁹ The ground surface in the slide area lowered an average of 35 feet during the earthquake.¹⁰ In the Government Hill area adjoining Elmendorf Air Force Base, a school slid into Ship Creek Valley, settling on top of an Alaska Railroad

VII. RESPONSE TO DISASTERS

warehouse.¹¹ At Elmendorf, the hospital and power plant were damaged, as were a variety of Fort Richardson buildings, including the barracks.¹²

Downtown Anchorage was also hard hit, and reports of the damage were horrific. According to one source, "a big crack opened up in the street and 3 or 4 people fell in and disappeared." The earthquake created a 30-foot chasm between 3rd and 4th Avenues, leaving the business district in "shambles." Nine people lost their lives, and more than 2,000 residents were left homeless.¹³

Also devastating was the damage to coastal communities southeast of Anchorage. Seward, for example, suffered heavy loss of life and property. On March 26, the day before the earthquake, the media announced that the National Municipal League had designated it an "All American City." One of the smallest communities ever to receive this honor, Seward, which boasted a population of 1,800, had been dubbed "the town that refused to die."¹⁴ This city, located on Resurrection Bay on the Kenai Peninsula, was one of the few all-weather ports in Alaska. As noted, Seward provided access from the coast by railroad and highway to Alaska's interior, and its economy was based on shipping and fishing. The earthquake decimated these industries.

According to many accounts, the shaking started gently, increasing to such violence that residents had difficulty standing without support. "Downtown, plate glass windows shattered into the street," reported one eyewitness. "China, glass, crystal, jewelry, hardware, paint, drugs, groceries, canned goods, jellies, pickles, wines — the liquor stores took a terrible beating — all one wild, sticky mess!"¹⁵ Along the waterfront, a Standard Oil tank exploded, causing extensive fires, and a strip of land 50-500 feet wide slid into the bay.¹⁶

Soon after the earthquake, a series of giant waves, called "tsunamis," battered the town, resulting in additional loss of life and property. According to one account, "whole trains were swept away and left a tangled mass of steel by the onslaught of millions of tons of water."¹⁷

Shortly following the earthquake, hundreds of residents attempted to reach higher ground. "Not one car left town that was not loaded to the limit," one observer noted. "Folks walking or running were picked up by strangers." Later, Seward residents marveled that this exodus proceeded in an orderly fashion. Some panic, however, was inevitable. One person, aware of the need to dress warmly, grabbed some clothes before fleeing his home, only to discover later that he had selected "a white dinner jacket and a couple of tuxedos."¹⁸

In Seward, 14 people lost their lives during the earthquake and tsunamis. Surveying the damage immediately after the disaster was a grim and sometimes grotesque experience for the town's residents. Survivors that were trapped in flooded areas floated in the icy water, clinging to debris from their houses. Cars, propelled through the town by the force of the waves, had landed in trees, and observers spotted a dog floating through the area on a mattress. A wet snowfall made walking difficult, adding to the problems of the "constant" aftershocks and explosions, and oil on the water surface continued to burn throughout the night.¹⁹

By the next morning, Seward residents had discovered that their waterfront, including the dock, small boat harbor, and Alaska Railroad facilities, were destroyed, eliminating the town's livelihood. Approximately 44 per cent of the homes were also wiped out. The town, however, retained the morale that had earned it the "All America City" award. "We will build it back," asserted one determined resident. "It can't be the end of everything!"²⁰

No community hit by the earthquake suffered more than Valdez, which was closest to the epicenter. Located on the northeast end of Prince William Sound, this all-weather port, like Seward, lost its waterfront facilities. Approximately 80 per cent of its buildings and structures were damaged. Much of the devastation in Valdez resulted from a submarine slide, which created a series of enormous tidal waves.²¹

Captain M. D. Stewart, Master of the SS *Chena*, recorded the ghastly events he witnessed immediately after the earthquake. This converted liberty ship, which was approximately 400 feet in length, had arrived in Valdez one hour and 20 minutes prior to the disturbance. From the deck of the bridge, Stewart watched the piers near the shore collapse. The *Chena* was then raised around 30 feet on an incoming wave, slamming down on the spot where the dock had existed only moments before. "I saw people running," he recalled. "They were engulfed by buildings, water, mud, and everything. The *Chena* dropped where the people had been. That is what kept me awake for days."²² Valdez suffered the highest casualties of any community, losing more than 30 people. Yet the town demonstrated a spirit similar to that of Seward. "I have no intention of picking up and leaving Valdez," resolved one survivor.²³

THE EARTHQUAKE IN SEWARD

Downtown, plate glass windows shattered into the street. China, glass, crystal, jewelry, hardware, paint, drugs, groceries, canned goods, jellies, pickles, wines — the liquor stores took a terrific beating — all one wild, sticky mess! In the hospital, drugs, acids, disinfectants, anesthetics, all the contents of the laboratory and storeroom, in smashed confusion releasing lethal fumes became another area of danger. It was only the quick thinking — and acting — of Mrs. Elsie H. Blue, Administrator, that prevented serious trouble. She dashed into the lab, closing the door behind her, and was almost overcome before she could get a window open. The soles of her shoes disintegrated from the combined chemicals. Suppose she had slipped and fallen on broken glass, or lost consciousness?

It was not until morning that we knew for sure the extent of our loss. Throughout the night a wet snow falling on already sloppy streets made walking a nightmare added to constant earthquakes and explosions. For several hours we were surrounded on three sides by fire with unscalable Mt. Marathon at our backs and constant expectation of land slides off the mountain. Across the Lagoon the folks who had left town while it was possible watched heartbroken as the town burned — they thought. Burning oil and burning debris, carried by six or more successive tidal waves (scientists later called the local disturbance “tsunamis”) rising at about 20 minutes apart, swept into the Lagoon, thence backwashed into the whole north end of town utterly destroying blocks and blocks of homes and other buildings.

Saturday brought clear blue sky and bright sun, placid water and quiet. As though nature was putting on a face of innocence trying to deny the outrageous violence of the night. Clumps of lumber, debris and parts of buildings, floated still burning on the mill-pond-smooth slack tide. Black smoke and vivid flames from burning oil tanks spread vivid color against the Alaskan blue sky, a beckoning hand to color photographers!

But what a desolation met the eyes as we surveyed the ground! A welter of bits of houses, roofs, overturned cars and trucks, boats of every description, box cars, railroad ties, wheels, furniture, covered the Lagoon Road and jammed the waters of the Lagoon itself. Railroad track sagged over open water where once had been a dike embankment over a tidal culvert. All the boats, big and little including a steel barge, in a tangled mess on the highway corner and Airport Road. Our beautiful small boat harbor with its new styrofoam float built at such cost and labor, two 20 ft. wide stone breakwaters and driven pile entrance gate — they're gone! The big San Juan Dock, city owned, leased by Seward Fish & Cold Storage Co., and Halibut Producers Cooperative, capable of processing 6,000,000 pounds of seafood a year — all those big buildings — gone! We just couldn't take it in, it wasn't possible.

... from *Seward Quake, Good Friday, 1964*, second edition, Records of the U.S. Army Corps of Engineers, National Archives, Alaska Region.

Other communities in South Central Alaska were similarly devastated by the earthquake and tsunamis. Tectonic uplift raised the land surface around six feet in Cordova, impairing this town's fishing and canning facilities. As a result, boats could no longer reach one cannery located on the edge of the Copper River Delta, and it had to be abandoned. Additional sea waves, one of which reached an estimated height of 80 feet, battered the Indian Village of Chenega in the Knight Island Passage, drowning 25 people. All homes were leveled in Chenega, where only the school house was left standing. Kodiak City, too, was hit by a series of waves, which killed eight people, damaged around 100 vessels, and inundated the nearby Kodiak Naval Station.²⁴ Alaskan wildlife was also affected by the disaster. Giant waves flooded coastal streams and lakes with salt water, killing fish, while land subsidence damaged salmon spawning areas. Tsunamis hit the coasts of Washington, Oregon, and California as well.²⁵

More than 100 people died in Alaska as a result of the earthquake and waves, and property damage totalled around \$300 million.²⁶ Alaska would have suffered even higher casualties had the disaster struck during the winter or at high tide.²⁷ Senator Ernest Gruening believed that his state had experienced a catastrophe worse than any other natural disaster in the nation's history.²⁸

The earthquake had left much of South Central Alaska without electricity, power, and running water. Many communities were isolated from the rest of the state as well as the Lower 48, owing to the loss of their communications systems, harbor facilities, and airports. One survivor recalled the eerie silence of the day following the earthquake; Alaska, it seemed, "had been wiped from the face of the earth."²⁹ Yet almost immediately residents began picking up the pieces, assuming the considerable task of rebuilding. Praising the resilience of his constituents, Senator Gruening noted that "What impressed all of us who went around to these stricken communities was the wonderful spirit of the people of Alaska in the face of unprecedented calamity. ... Those who have lost their homes and their businesses, who found themselves likewise burdened by mortgages and debts that seem to pose insoluble problems, kept their chins up, and 'we will start all over again' was the watchword of the hour."³⁰

The Corps, working with a variety of state and federal agencies, contributed significantly to their efforts. Immediately after the earthquake, the engineers inspected the hospital, barracks, and steam plants at Elmendorf and Fort Richardson. On March 28, President Lyndon B. Johnson declared South Central Alaska a disaster area, thus providing federal assistance. The Office of Emer-

VII. RESPONSE TO DISASTERS

gency Planning then called on the Corps to aid in the following tasks: provision of emergency relief; assessment of damage and restoration of public property; and support of state and local governments in essential recovery operations.³¹

Shortly after the earthquake, the Alaska District established a liaison with the Headquarters of the Alaska Command and with the Civil Defense Headquarters in Anchorage. Initially, Colonel Kenneth T. Sawyer directed the recovery activities of the Alaska District, and by August of 1964, Colonel Clare F. Farley had assumed that responsibility.³²

Disaster teams were dispatched by airplane to investigate cities and villages on the Kenai Peninsula as well as Valdez and Cordova. This early reconnaissance helped inform the outside world of the extent of the damage, and Seward residents cheered when they spotted the first airplane.³³ The U.S. Army brought food, water, radios, cars, and road building equipment to the shattered communities, while the engineers began restoring essential utilities and removing wreckage. One of their first tasks was to clear the road to Seward.³⁴ In Anchorage, the Corps also inspected more than 20 schools.³⁵

On April 2, 1964, President Johnson formed the Federal Reconstruction and Development Planning Commission to coordinate the recovery efforts. Representatives from the Corps served on many of the nine task forces that the Commission established. The Army Engineers became especially prominent on the Scientific and Engineering Task Force, which also included the U.S. Coast and Geodetic Survey and the U.S. Geological Survey.³⁶ Their objectives were to advise the Commission on the reconstruction of South Central Alaska and to conduct a scientific and technical study of the earthquake and its effects.³⁷

"It is important," President Johnson explained in May 1964, that "we learn as many lessons as possible from the disastrous Alaskan earthquake. A scientific understanding of the events that occurred may make it possible to anticipate future earthquakes, there and elsewhere, so as to cope with them more adequately."³⁸ He enlisted the assistance of the National Academy of Sciences in defining the scientific and technical issues to be examined. These included seismological investigations, studies of tectonic uplift and subsidence, geological causes of earthquake damage, and the effects of tsunamis on coastal areas.³⁹ Although these investigations occurred throughout the next 18 months, according to Erwin Long, "the majority of all that exploration was conducted in almost a four-month period," making it a "tremendously concentrated effort." To augment information on the disaster, the Army Engineers also "took interviews from

many people throughout the cities, since there were no hard copy records of the magnitude of the earthquake."⁴⁰ The Corps also assembled information regarding the conditions of public buildings damaged by the earthquake, offering recommendations on future design and construction.⁴¹

During the spring of 1964, the National Academy of Sciences formed the Committee on the Alaska Earthquake, to evaluate and publish the data collected by various agencies. The disaster in Alaska consequently became one of the most thoroughly studied, best documented earthquakes in history. The agencies involved in the recovery efforts drew lessons "from both the physical event and the human experience." Seismographic equipment was installed in Alaska shortly after the earthquake, for example, providing a basis for the study of aftershocks. Within a few months, the tsunami warning system for the North Pacific was improved, while risk maps were prepared for Anchorage, Homer, Seward, and Valdez, based on the geological studies of the Scientific and Engineering Task Force. Finally, the disaster in Alaska alerted the nation to the need for stronger construction codes as well as prediction and warning systems.⁴²

To the North Atlantic Treaty Organization (NATO), the lessons of the earthquake rang "loud and clear," reflecting the Cold War era. This organization viewed the damage as "a miniature version of what could happen in a nuclear attack." The earthquake in Alaska demonstrated "that a readiness to manage resources under any and all conditions is an indispensable component of a quick and effective response to the ordeal of disaster."⁴³

While the task forces and committees were gathering data and producing reports, the Commission prepared recommendations for special federal legislation to expedite recovery efforts. The proposed statute amended the Alaska Omnibus Act, passed six years earlier, and provided assistance for highways, urban renewal, debt adjustment, and disaster loans. Its purpose was to provide flexibility for federal programs struggling to cope with "the extraordinary circumstances arising out of the earthquake." Passed in 1964, this legislation authorized the Corps to modify previously authorized civil works projects to repair damage caused by the earthquake.⁴⁴

In particular, the legislation allowed for expansion of small boat harbors. Before the earthquake, the Alaska District had only one small boat harbor project at Sitka. After the disaster, Homer, Seward, Valdez, Kodiak, Seldovia, and Cordova required new shelters for their fishing fleets. These communities needed

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municipal docks as well. The Alaska and Seattle Districts shared responsibilities for developing waterfront facilities in South Central Alaska.⁴⁵

To maintain contact with the communities involved in this reconstruction, the Alaska District organized three new Resident Engineer offices at Anchorage, Valdez, and Seward. These offices contracted for demolitions as well as emergency repairs to sewers, water supplies, communications, and power distribution systems. The Seattle, Portland, and Walla Walla Districts joined the North Pacific Division in sending more than 60 engineers to Alaska to help develop the scope and cost estimates.⁴⁶

Major General (then Captain) Richard S. Kem was one of the engineers sent by Corps headquarters to assist with recovery efforts in Alaska. Kem in fact came to Alaska from as far away as Chicago where he was deputy district engineer. He later recalled his experiences on Kodiak where he served as project engineer in the restoration of the island's harbor. Kem arrived six weeks after the earthquake had hit and he found the town of Kodiak still littered with fishing boats that had been pulled into the town's center by the force of the tsunami. The enormous tidal wave had destroyed the breakwaters and the interior of the harbor. For the next six weeks, Kem coordinated the rebuilding of the harbor.⁴⁷

Looking back 25 years later, Kem remembered some of the interesting people he met while on this job. Describing Kodiak as "the fringe of frontier America," Kem characterized the residents as people who repeatedly attempted to escape civilization:

The people that were there on Kodiak Island had once been in the West and then migrated up to Portland and Seattle. Then when that became too civilized for them they moved on up to Anchorage. That became too civilized, too, so they moved on out to Kodiak. It was like reading characters out of Brett Harte's stories of the Old West. I mean, they were salt of the earth kind of people.⁴⁸

Kem also recalled overhearing some of the locals as they expressed their indignation over a new city ordinance that had recently made it illegal to abandon a used refrigerator or stove in the front yard of one's house. Kem thought that these residents believed this to be an "infringement on their rights." They felt so strongly that they considered relocating, or as Kem put it, "civilization was taking over the town; it was time to move on again."⁴⁹

Major General Kem further remembered problems on the project caused, in his estimation, by the contractor who was "trying to do [the job] on a shoestring." The contractor, Kem added,

got into the quarry and pushed his overburden down and then he loaded his shot and dropped the rock right on top of the overburden. Then he put his crane-shovel in on top of that and the shovel sank down into the overburden that he had pushed down there. So he had a mess and he fell behind schedule. And then his trucks were supposed to be equipped for safety with a secondary brake system. He drug his feet on doing that and kept putting it off day by day till I stopped his project. Four days later he had [the trucks] all done so he could finish up his project.⁵⁰

From his assistance with the recovery effort on Kodiak, Major General Kem "learned a lot about dealing with contractors." After rejecting several loads of rock, because the contractor "was throwing in some of the overburden," Kem had felt it necessary "to play a little hardball with him here and there."⁵¹ Despite difficulties with his contractor, Major General Kem successfully pushed the project to quick completion.

At Kodiak, as well as at other recovery sites in South Central Alaska, speed was an important consideration in rebuilding stricken communities, owing to the short construction season in Alaska. The Corps hired architecture-engineering firms to complete some of the projects it had defined. According to Erwin Long, the Alaska District acted as a "management group," contracting with Shannon and Wilson of Seattle, for example, to conduct a soil study in Anchorage. This company's investigations indicated that the slide areas needed to be stabilized before rebuilding could proceed.⁵² Army Engineers also supervised the dredging operations in Seward, where approximately 10 acres of waterfront was reclaimed from the sea. Contractors built a breakwater for Seward as well.⁵³

Nowhere were the Corps' efforts more extensive than in Valdez. Owing to the likelihood of further submarine slides, the Scientific and Engineering Task Force relocated the town at Mineral Point, about four miles west of the original site. Here the community would be less vulnerable to large earthquakes, and its docks and ferry slip could be reconstructed on bedrock. The Corps assisted the town in moving to its new location. Construction projects included the erection of a six-room school, which arrived prefabricated in Valdez just before classes resumed. By 1965, the new city dock facility was completed. The Army Engineers, one observer noted, had been "performing wonders" in expediting the moving and rebuilding of Valdez.⁵⁴

The Corps' work in the earthquake recovery efforts brought the agency praise and recognition throughout Alaska and the Lower 48. In June 1964, U.S. Senator E. L. "Bob" Bartlett described the Army Engineers' response to the disaster as "the biggest task and the most meaningful the Alaska District has been called

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upon to undertake."⁵⁵ Grateful for the assistance to his state, Governor William A. Egan predicted that "the work of the Corps in this disaster will be one of the greatest moments in its history." So appreciative was Governor Egan that he declared June 16, 1964 as U.S. Army Corps of Engineers' Day in Alaska.⁵⁶ The Office of Emergency Planning, too, on September 18, 1964, presented the Alaska District with a Certificate of Appreciation for Outstanding Performance for "unusual competence in carrying out the engineering and construction tasks performed following the destructive earthquake."⁵⁷ Three years later, the Corps continued its tradition of service to the people of Alaska when it faced another disaster, this time in Fairbanks.



EARTHQUAKE !

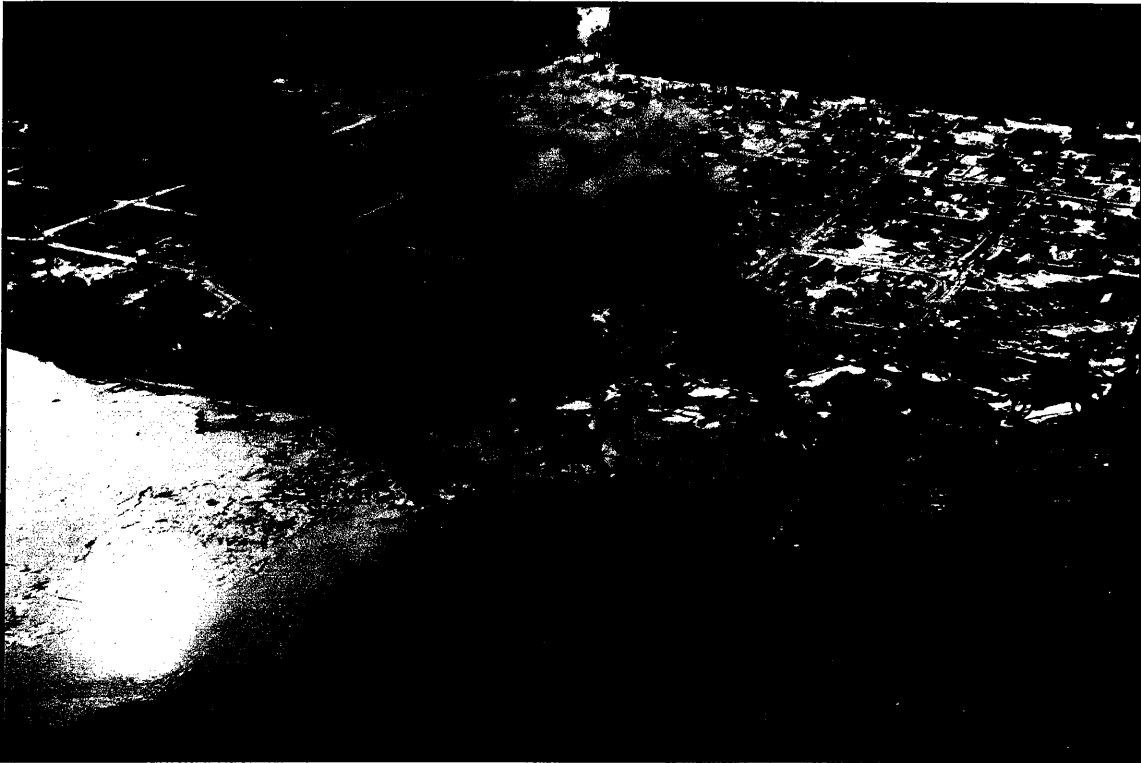
At 5:36 p.m. on March 27, 1964, the greatest earthquake recorded in North America struck the South Central section of Alaska. This disaster, which registered 8.2 to 8.7 on the Richter Scale, was devastating in magnitude, and many Alaskans remembered it vividly three decades later. The earthquake prompted a joint military-civilian effort at rescue and reconstruction that was unparalleled in Alaska's history. The Army Engineers' work included providing emergency relief, clearing debris, restoring public facilities, gathering scientific data, and conducting interviews with survivors.



Anchorage prior to the earthquake, September 1963.



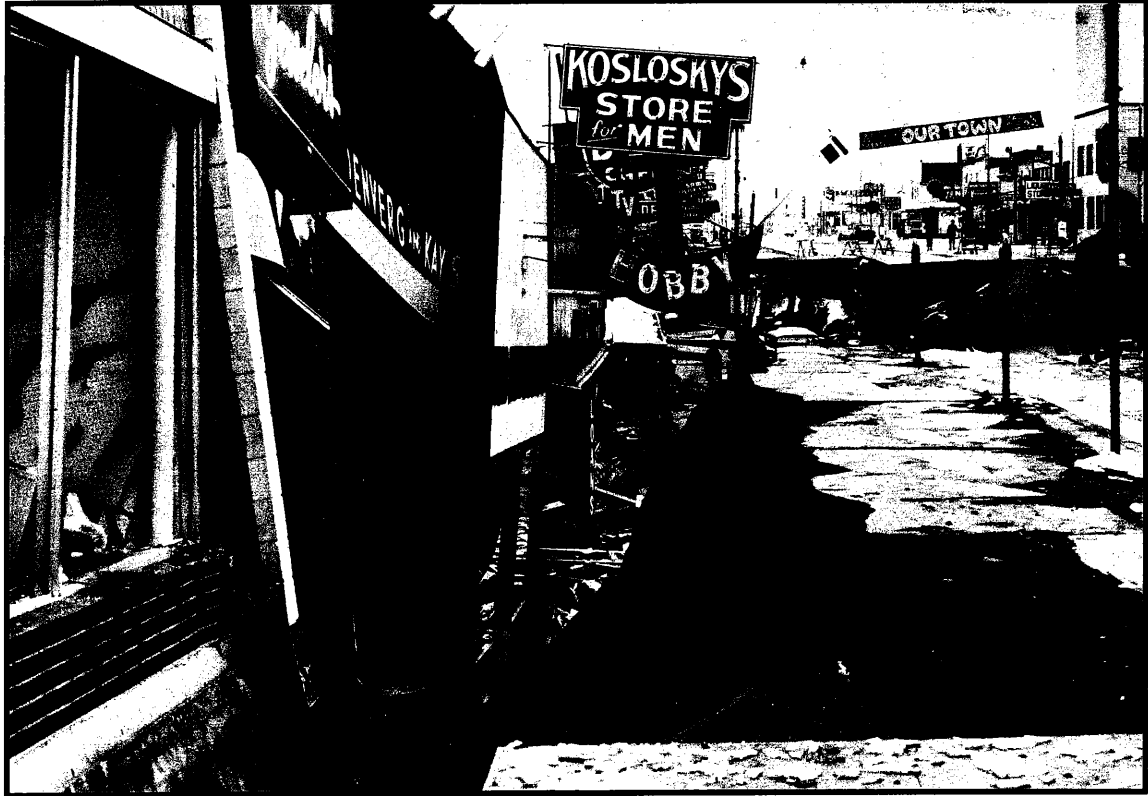
April 1964, aerial photo showing damage to Fourth Avenue business district – Anchorage.



March 1964, aerial photo of Seward showing burning oil storage tanks after the earthquake.



Anchorage, April 1964, Fourth Avenue slide area, between C and D Streets, looking west.



Anchorage, April 1964. Destruction on Fourth Avenue between C and D Streets.





Slide near the Alaska Native Service Hospital, Anchorage, March 1964.



Direct earthquake damage to the Four Seasons Apartment Building, Anchorage.



**Damage to residential areas in
Turnagain Arm.**





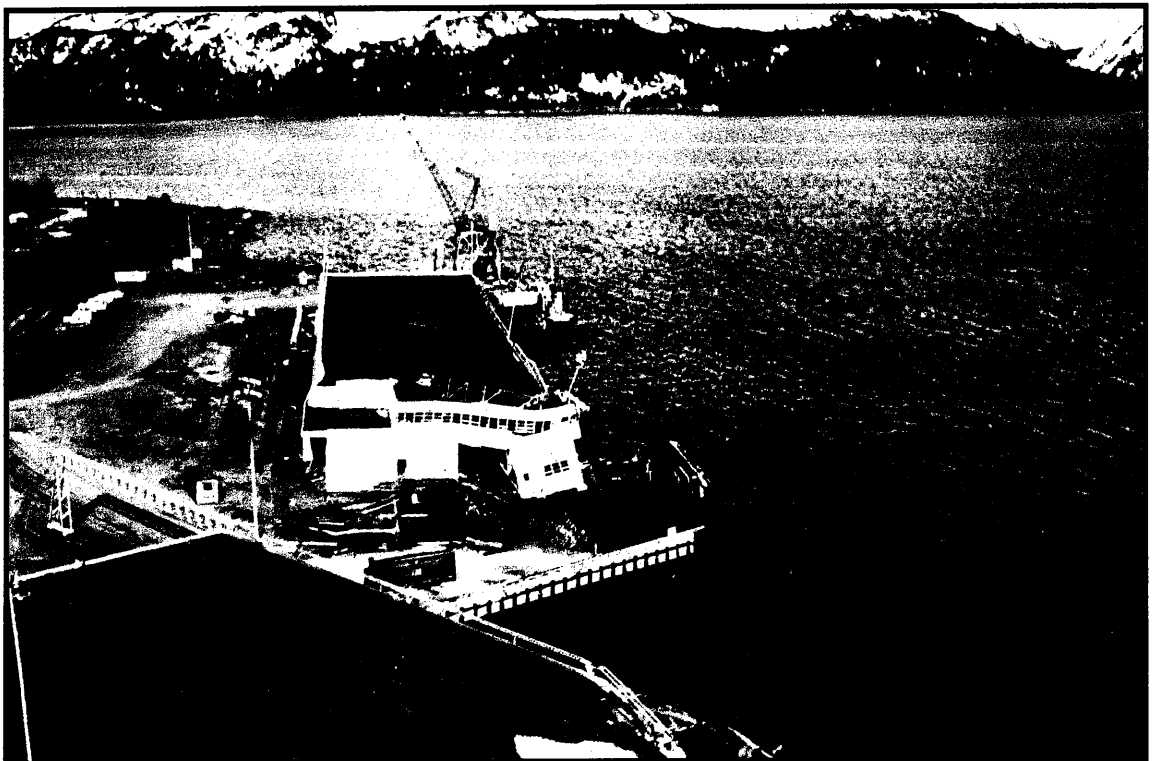
Earthquake damage at Anchorage small-boat harbor. Part of the fishing fleet is shown deposited among the scattered business and warehouse buildings.



Cleanup at West High School in Anchorage.



Cleanup of Fourth Avenue in Anchorage.



Alaska Railroad Dock and Warehouse at Seward, March 1964.



Seward waterfront damage.



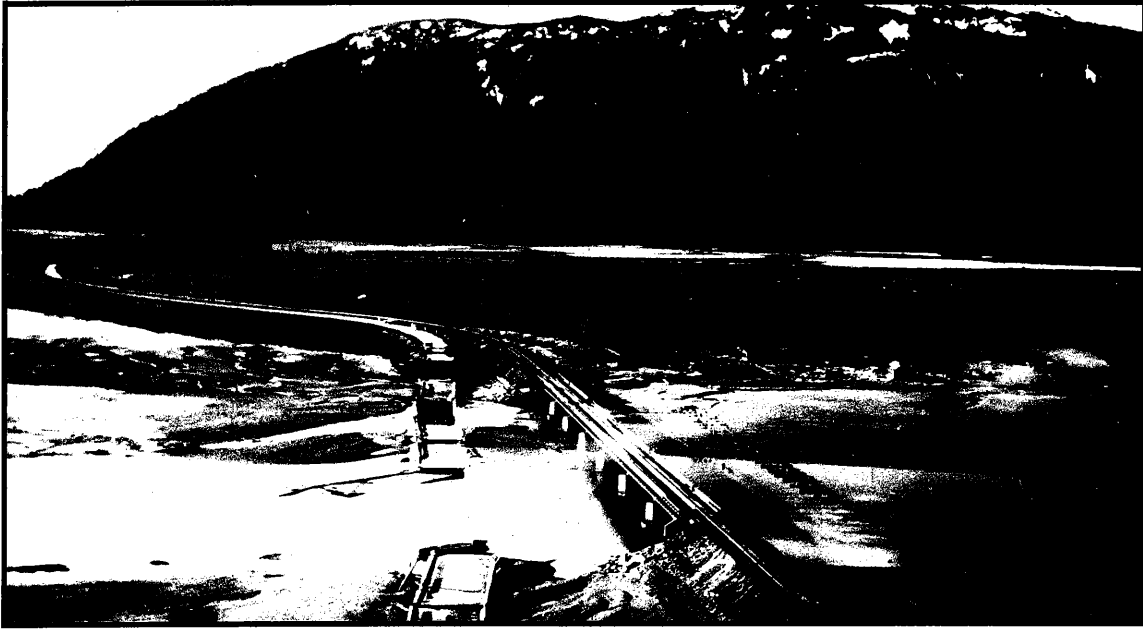
Oil soaked debris deposited in fresh water lagoon on Seward Highway, south of Anchorage.



Railroad track warped by earthquake land movement near Portage.



Earthquake damage to highway near Portage.



**Twenty-mile bridge
near Portage.**

**Aerial photo (top).
Detail photo (right)
shows bridge pilings
driven through
concrete deck by force
of the earthquake.**

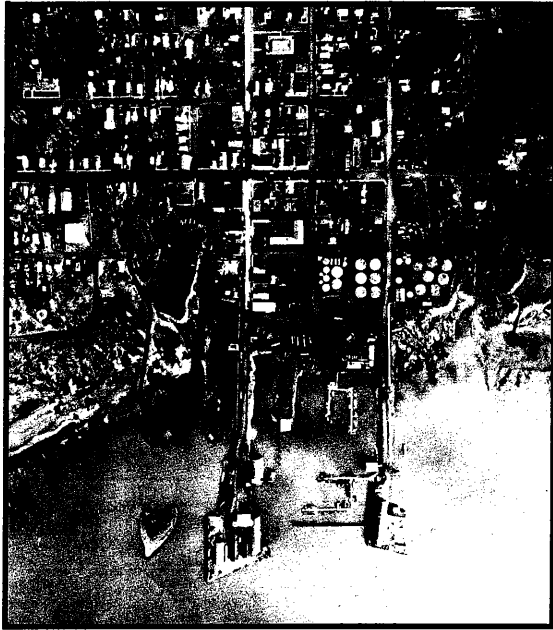




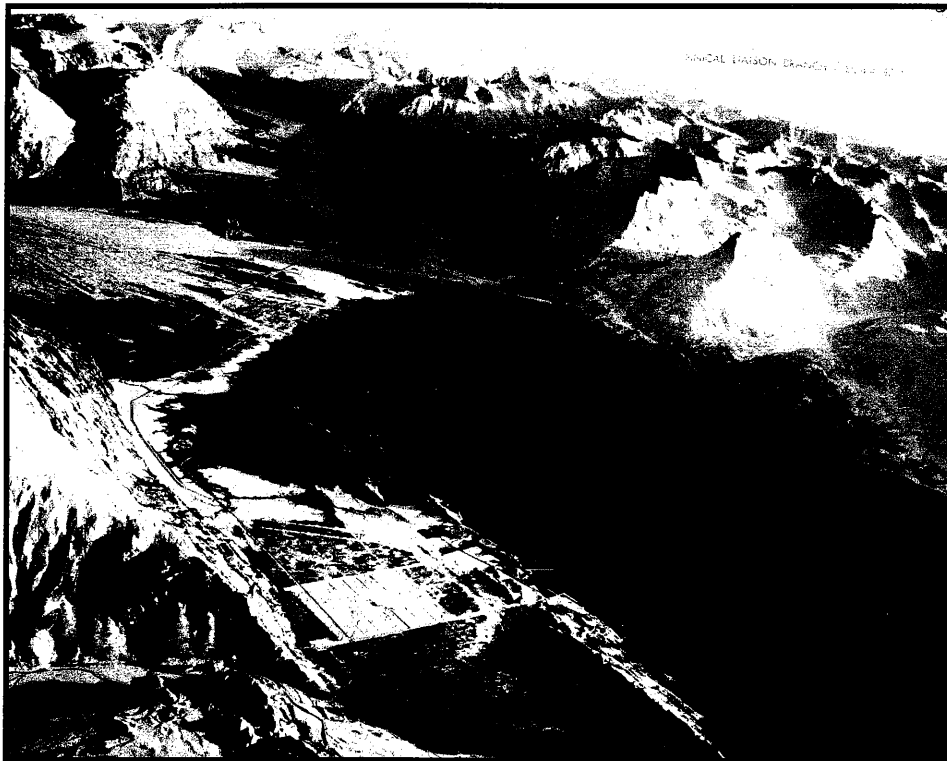
Seldovia, boardwalk at high tide in October 1964.



Seldovia residents walking on boardwalk at extreme high tide.



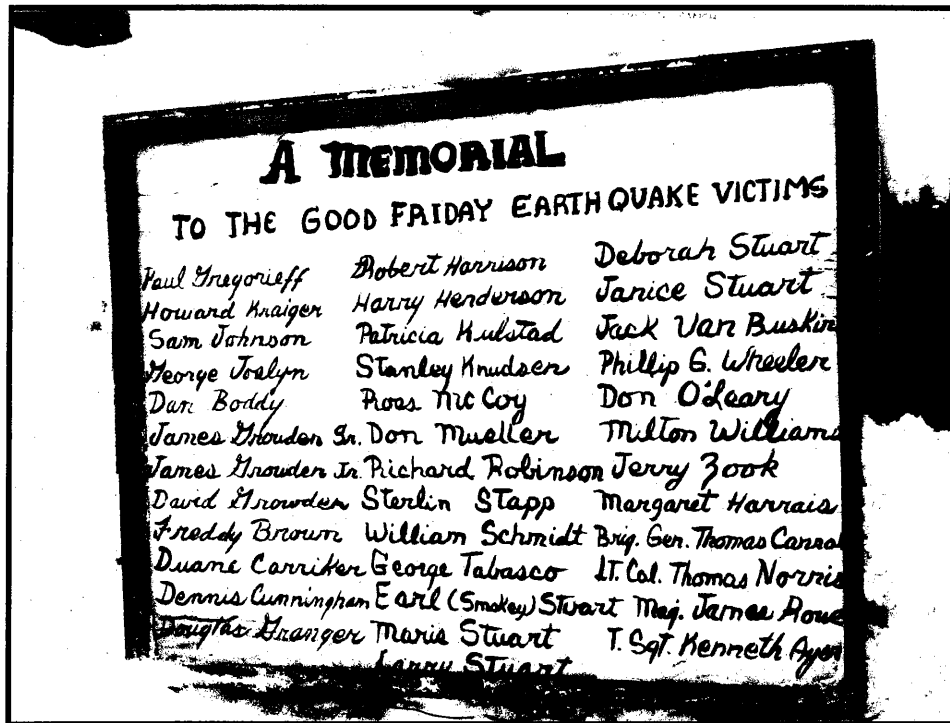
Valdez waterfront. Photo on the left is before the earthquake, while the photo on the right was taken in 1966.



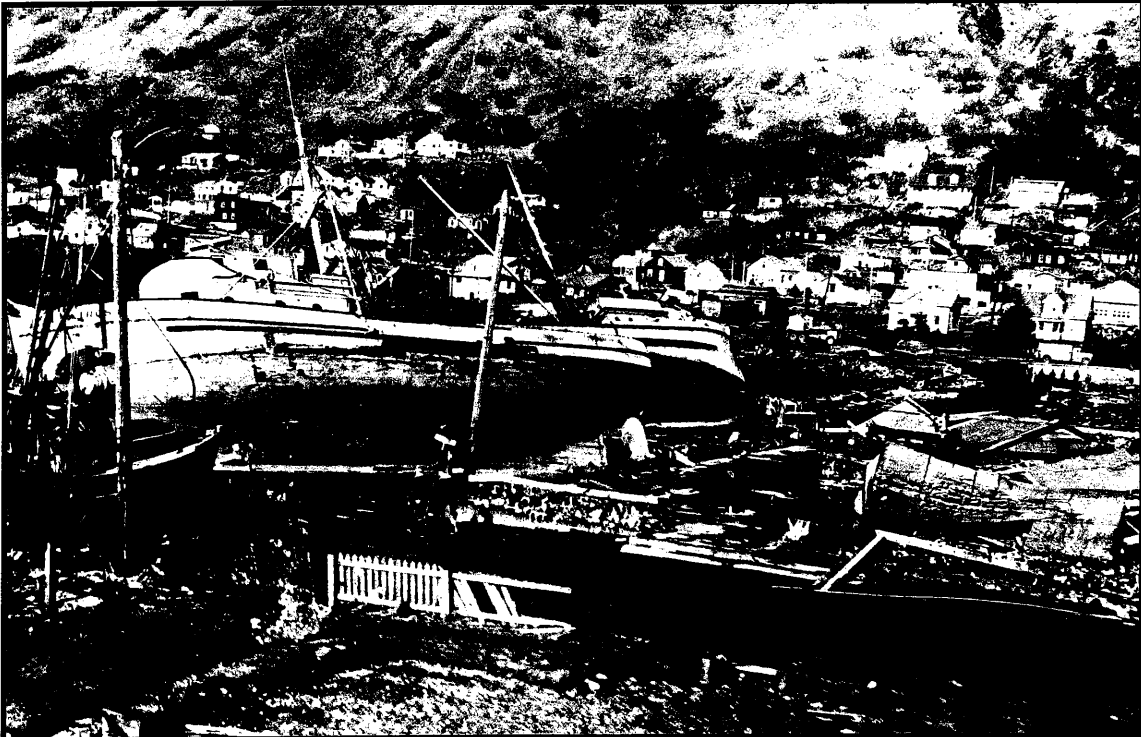
After the earthquake, the Corps helped move Valdez to the new town site, pictured in the foreground. The old town is visible in the background.



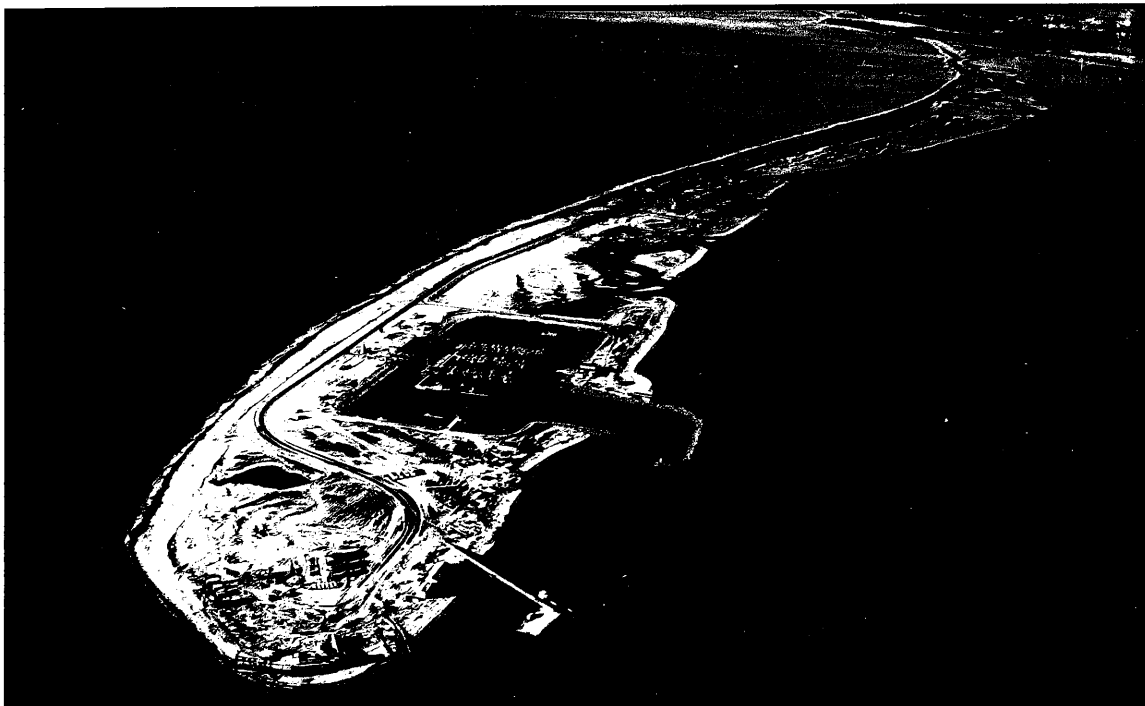
Valdez. McKinley Avenue after the earthquake and sea wave.



Memorial to victims at Valdez.



Two of Kodiak's fishing fleet deposited by the tidal wave at the intersection of Mill Bay Road and Marine Way.



View of Homer Spit looking toward the mainland. Expansion and earthquake restoration of the small boat basin, which shows in the center of the photo, was completed in May 1965. The harbor was expanded again in 1985.

THE FLOOD IN FAIRBANKS

Residents of interior Alaska have always worried about flooding. Throughout the 20th century, the spring breakup of ice has been an “anxiously awaited event,” since Alaskan rivers are most likely to overflow during this period.⁵⁸ [For additional information see chapter 9.] Fairbanks, located near the confluence of the Tanana and Chena rivers, was especially susceptible to flooding. As early as 1905, this new community was damaged by rising water. In the spring of 1937, too, ice jams caused the Tanana River to overflow into the Chena Slough and Chena River, creating such a deluge in Fairbanks that residents were forced to travel its streets in canoes.⁵⁹ In 1967, the city suffered the worst flood in its history. That year, the water pouring into the downtown area measured more than six feet deep. “Not since the Good Friday earthquake in 1964 has Alaska known disaster such as this,” observed one reporter.⁶⁰ Just as in the aftermath of the earthquake, the Corps joined a variety of federal, state, and local agencies in the recovery efforts, which included providing emergency relief to stricken communities as well as the restoration of public facilities.

The Corps’ attempts to control flooding in the Fairbanks area dated back to the 1930s. At that time, the Army Engineers recommended the construction of a three-mile levee to prevent the Tanana River from spilling into the Chena Slough. The Corps completed this dike during the 1940s, and six years later Congress directed the agency to determine whether the Fairbanks area required additional flood protection.⁶¹ In 1946, the Seattle District held a public hearing to discuss flood control measures for interior Alaska.⁶²

By 1951, the Corps had recommended the construction of the Fairbanks Flood Control Project, which included a high-water diversion dam on the Chena River, a five-mile diversion channel extending southwest to the Tanana River, and a 12-mile levee. The project’s cost would total around \$10 million, and local residents were to furnish all lands, easements, and rights-of-ways. This proposed improvement was included in the Omnibus Rivers and Harbors Bill during the 1950s. President Dwight D. Eisenhower vetoed this legislation in 1958, in a general attempt to reduce project expenditures.⁶³

The disaster of 1967 provided a new sense of urgency for flood control in interior Alaska. It occurred not during the spring but the summer — a season usually characterized by a hot, dry climate. That July and August, however, brought unusually heavy rain to the Fairbanks area, which was deluged with

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nearly six inches of rain in six days. Typically, the annual rainfall for Fairbanks measured less than 12 inches.⁶⁴

By mid-August, the swollen Chena River spilled into Fairbanks and the surrounding communities, driving residents to their rooftops. "This muddy, silty, oily torrent rampaged throughout the city and its outlying residential districts," noted one source, "turning them all into one huge, dirty brown sea." More than six feet of water surged through downtown Fairbanks, drowning seven people and destroying thousands of homes and businesses. Driven from their houses, nearly 15,000 residents took refuge in temporary shelters.⁶⁵ Fort Wainwright was also inundated, with water levels rising up to five feet deep.⁶⁶

Governor Walter Hickel, who surveyed the area during mid-August, was astonished at the damage that he witnessed. "Every piece of property has been touched," he reported. "It's terrible! It's terrible!" Hickel himself nearly became a victim of the flood when his army vehicle was almost swept into the swift current.⁶⁷ Similarly, one pilot assisting the evacuation efforts observed that "there isn't a home that isn't partially underwater; there's no electricity, no telephones, nothing, nothing but water." Initial damage estimates totalled around \$200 million, making this flood similar in magnitude to the earthquake.⁶⁸ "This is sheer disaster," Senator Bartlett concluded.⁶⁹

Although responsibility for disaster relief rests primarily with state and local governments, the Corps was authorized to assist in flood fighting and rescue operations as well as in the repair and restoration of public facilities. Like its work in the earthquake recovery, the Corps initially aided rescue efforts by providing technical advice and preparing maps. In the Nenana area southwest of Fairbanks, the Army Engineers coordinated with Clear Air Force Station for the evacuation of residents. The Corps also assessed flood conditions in Fairbanks, indicating the best routes for evacuation. The 50,000 sandbags that the Corps provided ultimately proved ineffectual, however, owing to the volume of water and the speed at which it rose.⁷⁰

The Army Engineers also conducted early surveys of the extent of the flood's destruction. North Pacific Division Engineer General Elmer P. Yates accompanied Alaska District Engineer Ernest L. Hardin on an aerial reconnaissance of the flooded area, and the Corps sent additional specialists from Portland and Anchorage to investigate the damage.⁷¹ On August 17, 1967, President Johnson declared Fairbanks and nearby communities a federal disaster area, earmarking an initial \$1 million for emergency relief. He also directed the Office of Emer-

gency Planning to speed plans for recovery.⁷² Once again, the Corps coordinated the reconstruction of utilities as well as buildings and structures.

To this end, the Alaska District maintained a liaison with personnel from city government as well as the Red Cross, Office of Civil Defense, State Highway Patrol, U.S. Army Command, and U.S. Air Force Command.⁷³ These agencies had to move quickly, owing to the rapidly approaching winter. "I've had 30 years of experience with disasters," noted one Red Cross worker, "and I've never had to deal with one where we had a deadline before."⁷⁴ Aware of the urgency of the recovery efforts, the Corps awarded its first construction contract, for repair of the dikes, before the floodwaters receded. By August 21, the Army Engineers had arranged a \$290,000 contract for cleanup of flood wreckage and repair of Fairbanks streets.⁷⁵

Soon after, the Corps set up the Fairbanks Flood Center in the downtown area, to coordinate the "constant stream" of contractors as well as state, city, and burrough officials. In its first five days, this office awarded 16 contracts worth more than \$1 million, to expedite the recovery of Fairbanks. By early September, the Corps had awarded 42 contracts totalling more than \$3 million.⁷⁶ The Army Engineers also contracted for rehabilitation of the electrical distribution system, for provision of free bus transportation for residents of Fairbanks, and for dewatering operations for those areas with inadequate natural drainage.⁷⁷

Much of the Corps' recovery work focused on inspection of public buildings and structures. While the destruction of the earthquake had been highly visible and immediately apparent, flood damage was sometimes more difficult to detect. The Corps' inspections included schools, which were scheduled to open in September, as well as facilities at Fort Wainwright.⁷⁸

Like the earthquake, the flood of 1967 made Alaskans more aware of the Corps' responsibilities in responding to emergencies. So appreciative was the state legislature of the Army Engineers' "prompt and energetic efforts" in alleviating "the damage and hardship" of flood victims that it issued a resolution commending and thanking the agency.⁷⁹ The Fairbanks *Daily News-Miner* also praised the Corps, noting that in its restoration of public facilities the agency demonstrated the spirit of its motto, "Essayon," or "we will try."⁸⁰

The disaster of 1967 had national, as well as local, implications. It helped convince Congress, for example, to pass a national flood insurance program.⁸¹ Soon after the event, the Alaska District constructed a flood warning system for

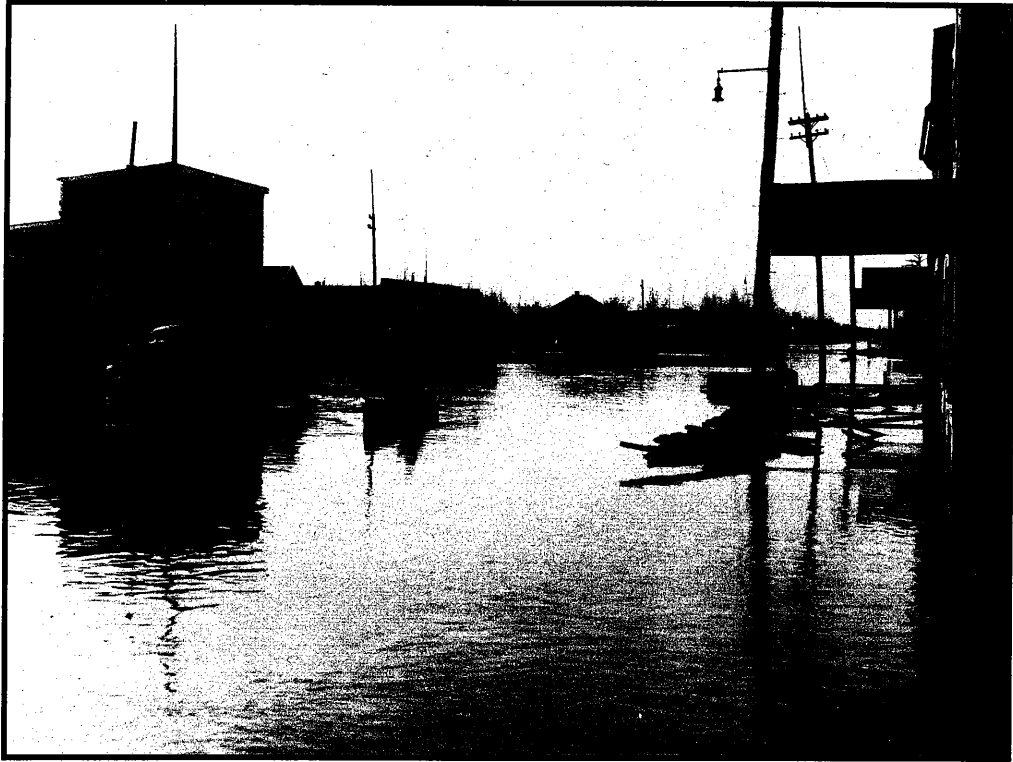
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the Tanana and Chena valleys, which included six stream gauging stations funded by the North Pacific Division, U.S. Weather Bureau, and U.S. Geological Survey. These facilities monitored river levels, transmitting information about potential floods by radio signal to the relay station at the Moose Creek Bluff Nike missile site. The new system provided Fairbanks up to two days of advance warning. The Alaska District also established a flood control center at Anchorage.⁸² One of the most significant results of the flood of 1967 was the widespread support for the Corps' proposal to build a two-dam levee and flood control project, to ensure that such a disaster would not occur again. [For additional information see chapter 10.] The Chena River Lakes Flood Control Project, constructed in the 1970s, was to become one of the Corps' most successful operations in Alaska.

CHENA RIVER FLOODS, 1937 TO 1967



Chena River Flood, Fairbanks, 1937.



Chena River Flood, Fairbanks, 1948.



Looking north at 1st and Dunkel in Fairbanks, 1948.



Chena River Flood, 1967.