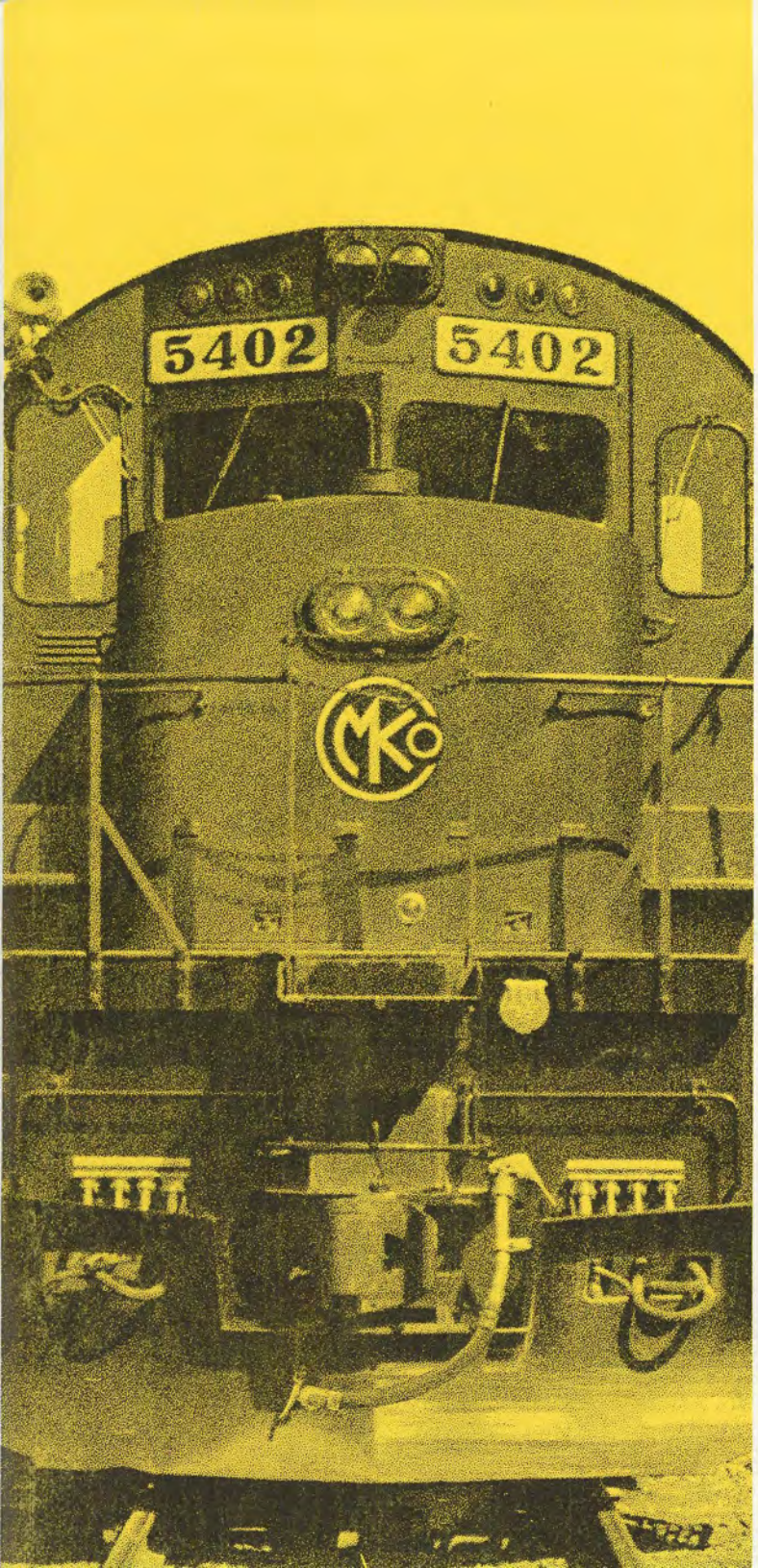


M-K & the Railroads

M-K & the Railroads

Morrison-Knudsen Company cut its teeth on railroad work. The company was founded at Boise, Idaho, in 1912 when the West was still young and when the horsepower that handled the heavy chores of construction either ate hay or burned coal. In 1915, M-K landed its first railroad job, and has been working practically without surcease ever since for America's railroads or on the railroads of other nations.

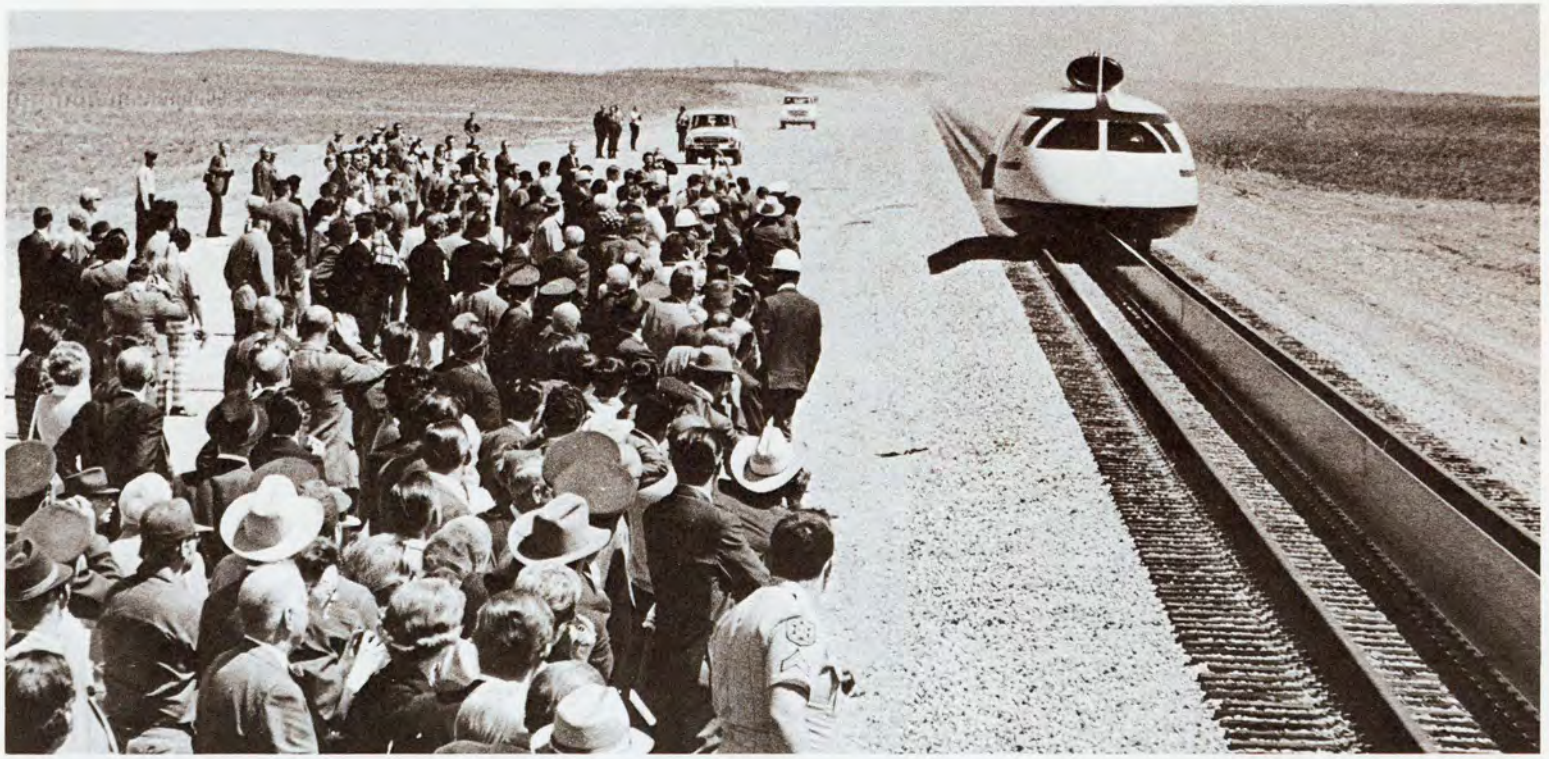
Today, M-K ranks as one of the largest and most widely experienced construction and engineering organizations in the world. With its specialized subsidiaries, this organization performs all kinds of projects—industrial plants, power plants, dams, high-rise buildings, airports, highways, bridges, pipelines—and has performed them in almost 60 countries to date. It owns and operates what is probably the largest fleet of heavy equipment (some 3,500 major units) of any construction organization. And, it has earned a very special reputation for integrity and for getting things done on time, whatever the job and whatever the challenges.

Down through the years, M-K construction men have built hundreds upon hundreds of miles of new railroad grade. They have erected bridges by the score, bored great tunnels and daylighted others, crushed countless carloads of roadbed ballast, responded to emergencies in devastating storms and floods, built a causeway across an inland sea, put down mile after mile of new track, and done a host of other tasks along mainlines, spurlines and sidings. They have done so throughout the Unites States, in Mexico, in the cold of Alaska and Labrador, in the outback of Australia, on the sere face of the Peruvian Andes, and through the jungles of Brazil and Venezuela.

In the process, M-K men have developed many a new tool or new method of performing railroad construction. They have also developed a strong and enduring kinship with men of the railroads—men who know and respect the value of skill and experience, the importance of schedule and timetable, and the singular effectiveness of hard work and team work.

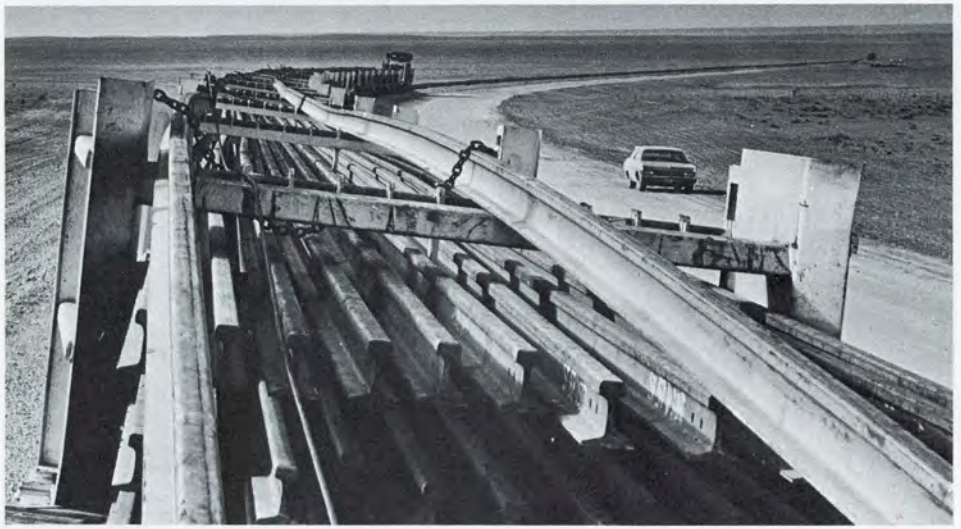
The following pages present a portion of M-K's history of working on the railroads, a story that has many chapters and many settings, a story that will go on and on, a story that is irrevocably tied to the twin ribbons of steel that are the basic pathways of commerce and progress.

Rails to Tomorrow



Crowd watches as protoytpe of "LIM" (linear induction motor) car makes first run on tracks laid by M-K at the U. S. Department of Transportation's new High Speed Ground Transportation Test Center near Pueblo, Colo. Extensive program of precision track work and electrification was performed by M-K at the center in 1970-71.

Strings of continuous welded rail, each 1,440 feet long, are pulled from rail train at the test site. Experimental vehicles using this track and other test facilities are expected to hit speeds of more than 200 mph.

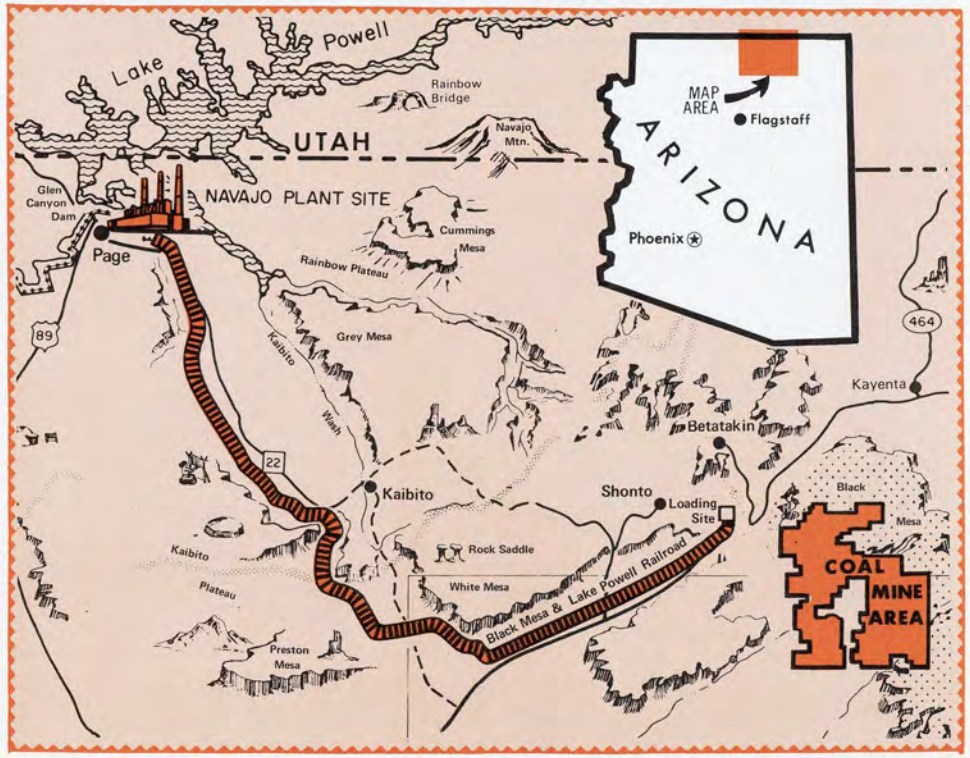


M-K locomotive travels ribbon rail laid at the new test center on Colorado plains. Track was aligned to tolerances of 3/64-inch in 10-foot cord spans along roadbed having as much as 8½ inches of superelevation.

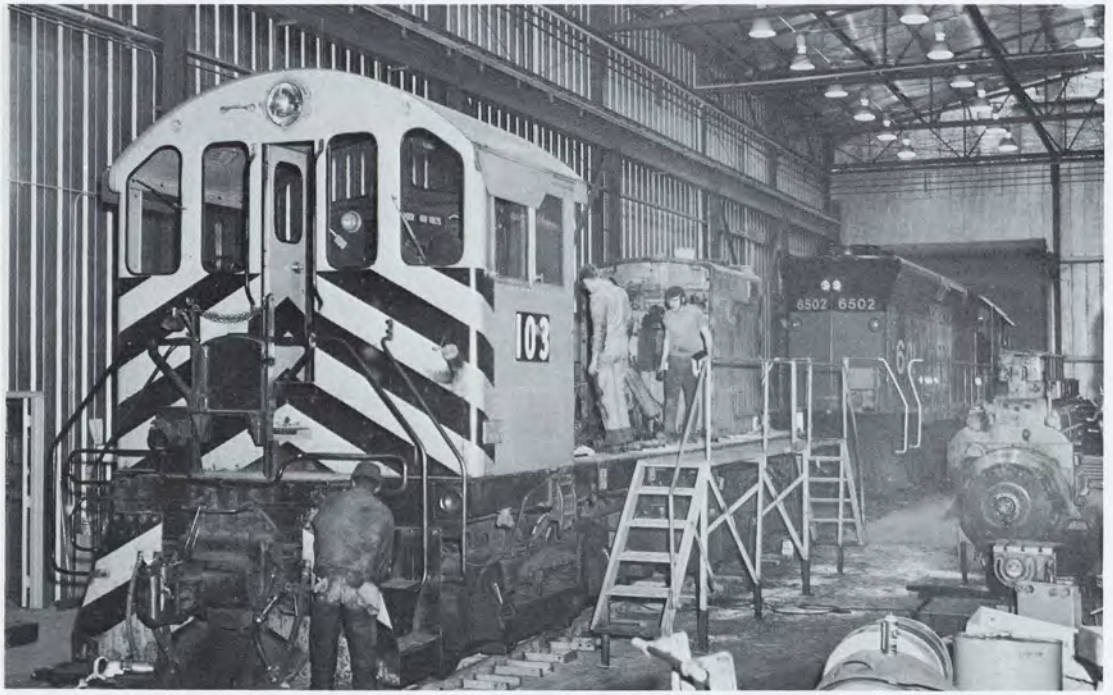
Roadbed grading progresses in northern Arizona as part of complete "turnkey" project by M-K organization in 1971-72 involving design, construction and procurement for 78-mile electrified railroad to carry coal to Navajo Power Plant.

Sketch shows type of 5,100-rail-rated-horsepower electric locomotives that will propel 73-to-83-car unit train on Black Mesa & Lake Powell Railroad (see map, below) serving Navajo Power Plant. The 50-kilovolt line is first to use such a high voltage.

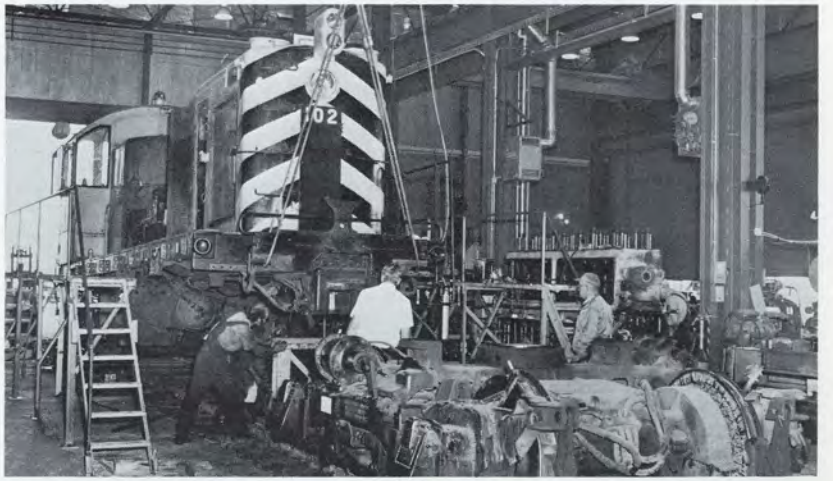
In northern Quebec, rail is welded into 1,400-foot strings and stockpiled (right center) beside existing railroad for use on 88-mile route under construction in 1971-72 by M-K's Canadian Division and an associate to transport iron ore.



Locomotive Rebuilding and Specialized Equipment



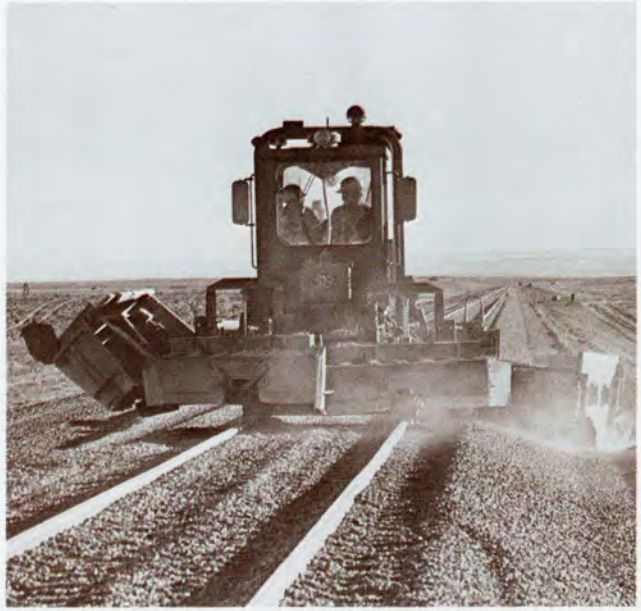
Railroad expertise of M-K organization also includes repair of locomotives and fabrication of a number of items of specialized equipment at the company's central shop complex at Boise. Facilities and knowhow are available for complete rebuilding of any diesel-electric locomotive. Above, 660-horsepower and 3,600-horsepower locomotives are shown undergoing repair at the Boise shop. Below, an EMD SD45 locomotive ready for service after refurbishing.



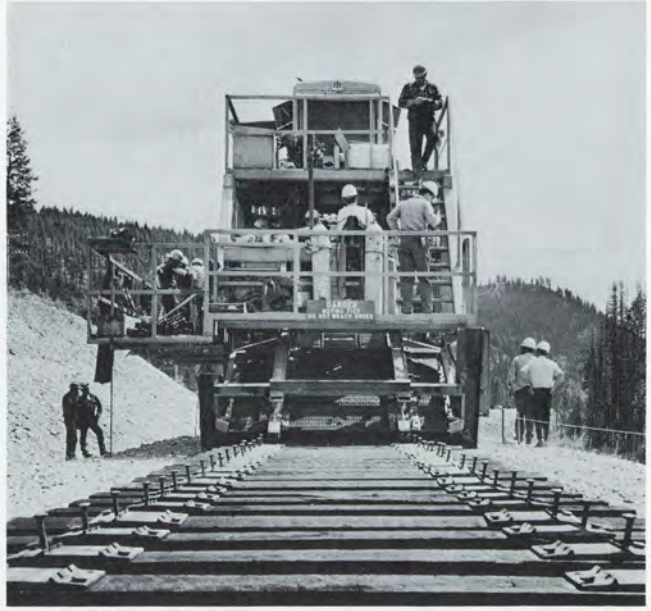
Another 660-h.p. locomotive undergoes complete overhaul at Boise (above) and emerges (below) freshly painted and ready to resume its career.

This continuous-welded rail train, capable of carrying 48 welded rails up to 1,440-foot lengths, is one of two fabricated by M-K for use in the company's construction operations. They also are available for lease.

Specialized equipment follows CWR train in modern tracklaying sequence utilizing controlled cooling.



Ballast regulator with broom attachment at rear works on new high-speed test track in Colorado.



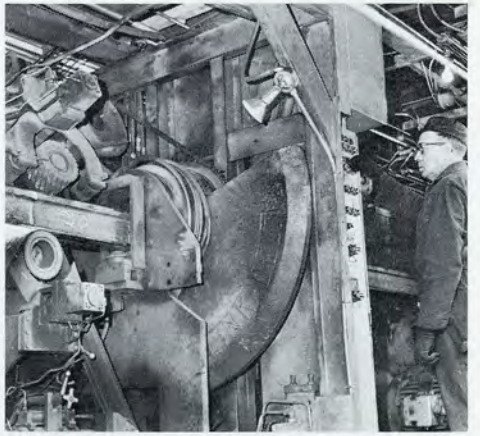
Tie-laying machine was designed and fabricated at Boise, along with similar machine for concrete ties.

M-K has patented, and is producing at Boise, controlled-flow doors for superior ballast dumping. The doors are available upon order and can be adapted to any type of hopper car. A typical installation on an M-K car is demonstrated in the photo above. At right, doors are prepared for shipment from the Boise shop to a major railroad.

Two strings are pulled from rail train simultaneously by wide-axle rig during 1970 project by M-K involving rerouting main line of the Burlington Northern around reservoir area of Libby Dam in northwestern Montana. In addition to 59 miles of main track and 17 miles of secondary track (spurs and sidings), M-K was also responsible for installation of signal and communications facilities.

Strings of continuous welded rail, varying from 1,352 to 1,398 feet in length, are stockpiled near Jennings, Mont., during Libby project. In background are loaded ballast cars, equipped with M-K-patented doors to regulate ballast flow.

Sixteen strings of continuous welded rail are loaded onto rail train from stockpile near Jennings, at western end of the Libby (Montana) project. Four 16-rail tiers go onto the 28-car train.

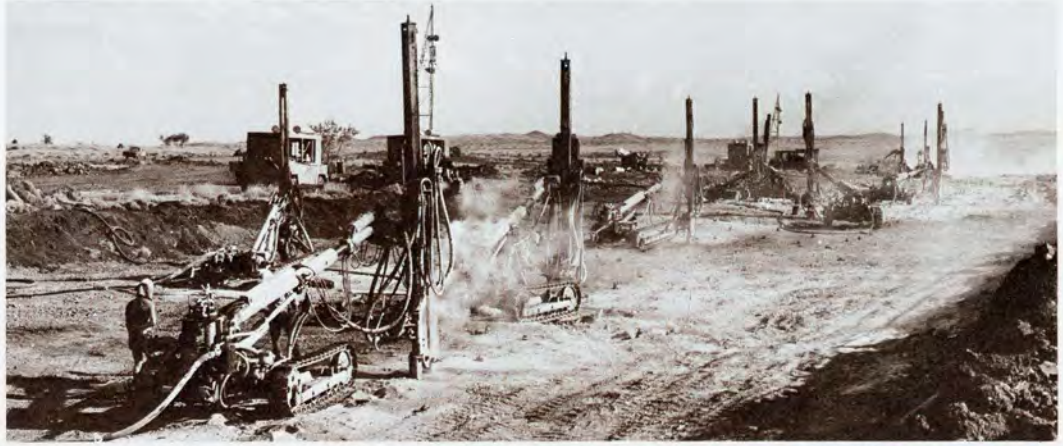


Ribbon rail in the making. Precision grinding smooths weld in 132-pound rail during continuous welding operations.

Air-operated tie distribution machine spikes plates to ties and places ties at proper spacing within ½-inch of final alignment. With crew of 12, machine can cover three miles a day.

Ten-span bridge under construction in 1972 by M-K and associates across the Fortescue River in Western Australia as part of 105-mile Robe River Railway project. Quadruple 12-foot culverts (below) were installed in 1971 on 65-mile Paraburdoo Railroad project.

Ballast train moves along new tracks of 65-mile Paraburdoo route in Western Australia, one of four major railroad projects in same region by M-K and associates since 1965 that have involved total of nearly 700 miles of new construction for transport of iron ore.



At Robe River Railway project in Australia, drills work in rock area as part of 7-million-c.y. excavation program completed in 1972. Below, M-K-designed tie laying machine works on Paraburdoo route.

Drilling and blasting of some 2,100,000 cubic yards of rock progresses during construction of 180-mile-long Hamersley Railroad in Western Australia. Completed well ahead of schedule in 1966, pioneer route reaches from coast of Indian Ocean to enormous deposits of iron ore in outback region. Project involved 180 track-miles of continuous welded rail 'main line' built to support heaviest axle loadings in Australia, and 20 miles of bolted-rail yard trackage and sidings.

Ballast is tamped along Hamersley Railroad during final construction operations in winter (Australia's winter) of 1966.

Second M-K built port-to-mine railroad to Australian iron ore deposits, Mt. Newman Railroad, is opened amid ceremonies on January 22, 1969, as first trainload of ore leaves mine for 265-mile journey to port on Indian Ocean. This pioneer route, begun in July, 1967, included 265 miles of 'main line' track (262.5 miles of continuous welded rail) and 22 miles of secondary track. Work train made up of ore cars (above, left) was used to transport sixteen 1,440-foot strings of 132-pound continuous welded rail from stockpile (below, left) during operations that included a record day (May 8, 1968) in which 4.35 miles of track were laid, spiked and anchored in 11 hours and 40 minutes, and a top month (October, 1968) in which 49.7 miles of track were completed.

More than 2,100,000 pounds of explosives were detonated during this quarry blast at Little Valley, Utah, when construction was in progress on the 13-mile Southern Pacific causeway across Great Salt Lake. The big blast, one of many, yielded 3,700,000 cubic yards of fill material for the causeway.

Electric shovels load out sand and gravel for Salt Lake Causeway. In three and a half years of earthmoving, some 45,000,000 yards of material were handled for this crossing of an inland sea.

Steel barge (above) laden with 2,000 yards of fill material makes its way across Great Salt Lake during M-K's causeway project for the SP. Both bottom-dump and deck-type barges were employed. Freight train (right) speeds along completed causeway, which rises from a dredged foundation trench ranging from 175 to 600 feet in width and replaces old trestle seen in the background. Maximum height of the fill is 97 feet. The causeway was designed by International Engineering Company, an M-K subsidiary, in close liaison with the SP and was completed by M-K nine months ahead of schedule.

Working On The Railroads In Yesteryear

Every story must have a beginning, and these pictures tell the beginnings of the story of M-K and its work for the railroads. It began with steel and steam, horses and horsepower, and, most important of all, it began with men. The magnificent plumes of smoke that once bent above the engines and shovels of yesterday have faded into the past and the compelling call of the steam whistle across the land is now but a memory for most. It was a good beginning, a meaningful beginning, and M-K is proud of it.

New diesel running repair shop at North Platte, Nebraska, designed and built by the M-K organization under a "turnkey" contract, was opened by Union Pacific in 1971. Incorporating some of the most advanced maintenance concepts in modern American railroading, the facility enables crews to inspect and service up to 300 locomotives a day and perform running repairs on more than 400 locomotives a month. The L-shaped structure measures some 400x460 feet. Design was performed by International Engineering Company, Inc., a wholly owned M-K subsidiary.

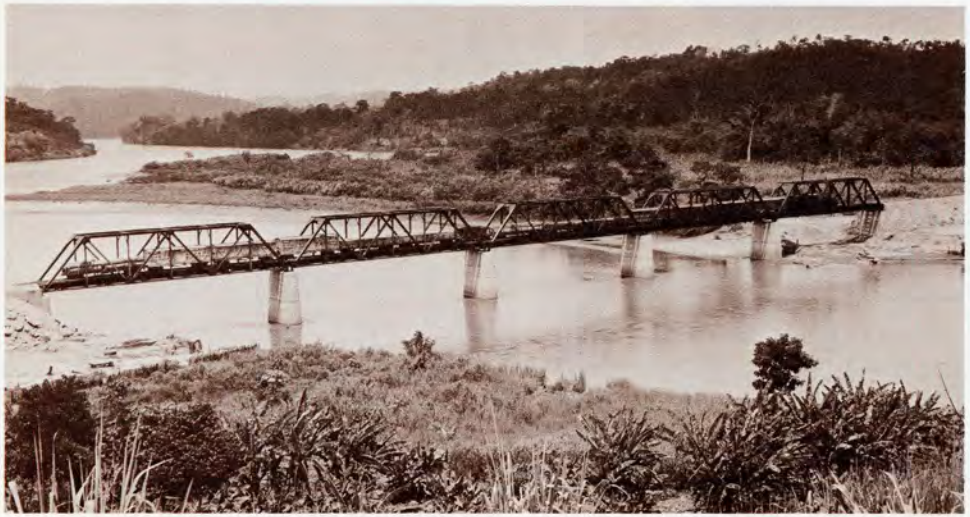
Trainload of ballast heads toward new track during relocation by M-K-sponsored joint venture of 12.2 miles of line for the Alaska Railroad in 1949-1951. Project took kinks (48 curves) out of route along rock-rimmed Turnagain Arm just south of Anchorage.

Blast in 1962 helps open cut, 8,000 feet long and 120 feet deep, during construction of 32-mile section of 36-mile spur line from D&RGW main line to potash mine near Moab, Utah.

This 1,200-foot-long bridge was built across the Snake River as part of a relocation program necessitated by Lower Monumental Dam. The bridge was finished in 1968.

M-K men erected two deepwater piers for new bridge reaching across Burrard Inlet from new two-mile tunnel beneath city of Burnaby, on the outskirts of Vancouver, B.C. Tunnel was opened in in 1967 to carry Canadian National Railways track directly to shore of inlet and thus eliminate looping curve in surface route through city.

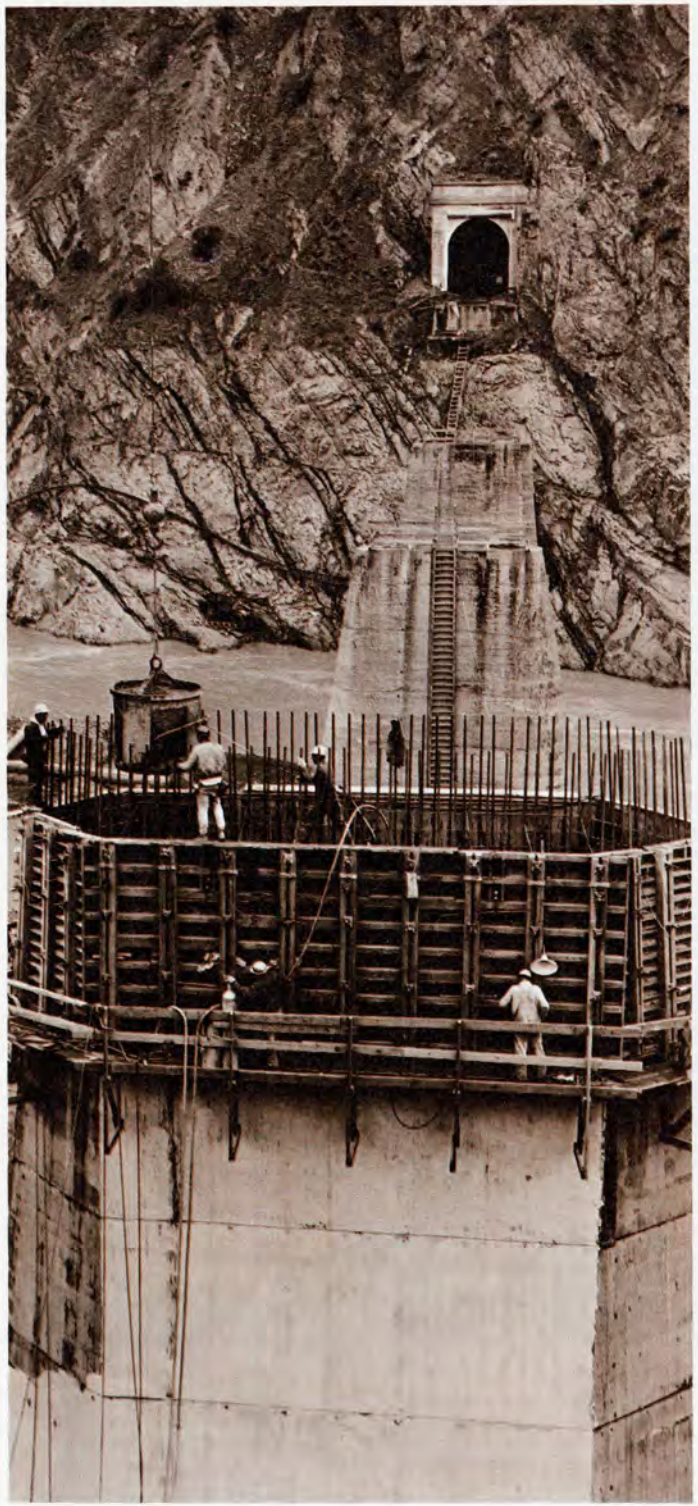
Piers are enlarged and rehabilitated (1966-1968) at Union Pacific's venerable Joso Bridge, a 3,920-foot-long structure that has carried traffic across the Snake River in Washington since 1914.



First train crosses new 675-foot-long bridge over Brazil's San Antonio River in 1950. Structure was one of 12 crossings built by M-K during two major rehabilitation projects on port-to-mine route reaching 375 miles from port of Vitoria to Caue Mountain iron ore deposit in the interior. First project (1944-1946) and second project (1948-1950) involved total of 280 miles of rehabilitation work, including more than 100 miles of pioneer grade through jungle and swamp, two major tunnels, and 110 miles of new track construction. M-K's subsidiary, International Engineering, prepared reports covering the handling of railroad ore shipments to the port.

Using a 120-foot-long "lifting beam" specially devised for the job, M-K men raised this bridge four feet in height along its entire half-mile length to give added clearance above flood waters. The girders of the bridge, located near Snohomish, Wash., were raised in increments by hydraulic jacks attached to the beam so that concrete shims could be inserted between the undersides of the girders and the tops of the old concrete piers.

Responding in Emergencies



Eel River's 'thousand-year flood' in northern California in December, 1964, and January, 1965, wiped out 100 miles of track and three bridges of Northwestern Pacific Railroad. M-K and railroad men began restoring line while floods were still ebbing. By April, track was tied together for work trains and by June the entire line was opened. Months of riprapping and grade work followed to restore line to former operating condition. New 90-foot-high pier is erected (left) for line's Island Mountain Bridge, while dozer and loader (above, left) clear compacted silt left by flood at drainage culvert. Lowboy rig (right) hauls 30-ton railroad car to one of isolated areas along line for use in work train on renovated stretch of track left devastated (below) by flood.

Southern Pacific engine (above) crosses temporary trestle built across a slide area as part of emergency work in the High Sierras during Christmas-time storms of 1955. The rock walls of this burned-out tunnel in California (below) were still warm when M-K crews began repairing the damage. They restored service in only 11 days.

M-K men and equipment performed yeoman service after a 1952 earthquake in the Tehachapi area of California. Working 20 hours a day for 24 days, they moved 1,250,000 cubic yards of earth to daylight the full length of two quake-shattered tunnels, part of another, and to build a shoo-fly around a fourth.

Drillers work at quarry site beside the Moisie River in northeastern Canada during construction (1950-1954) of Quebec North Shore and Labrador Railway, a pioneer line reaching northward 365 miles from the Gulf of St. Lawrence to an iron ore deposit at Knob Lake in a region of trackless tundra and muskeg.

Construction equipment is loaded on barge at Montreal for shipment to QNS&L project. M-K was one of four companies in joint venture construction team which built the line.

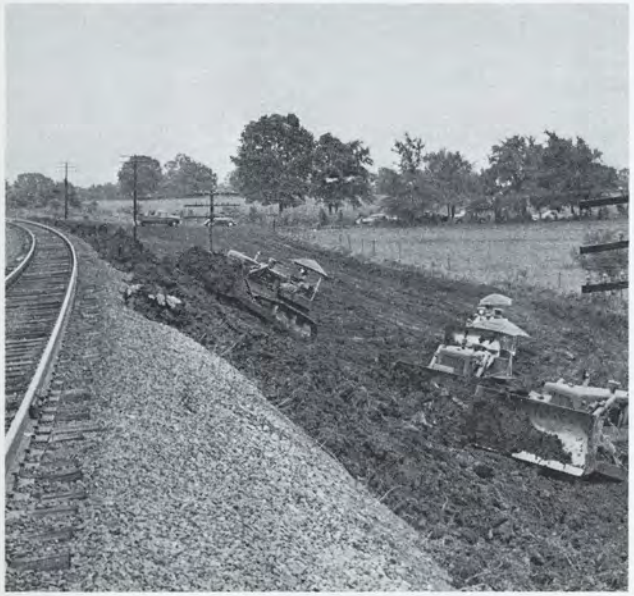
Crack 'Empire Builder' speeds past scraper working on three-mile line change near trackside town of Index, in Cascade Mountains of Washington.

Tough job in Venezuela nears completion in 1954 as spurs are tied into main line of 91-mile-long pioneer railroad reaching across jungle, swamp, and grasslands between river port and iron mine. The project, including 90 miles of highway in addition to new track, was finished in less than two years.

In response to emergency summons, M-K repaired this 1400-foot-long tunnel that collapsed at both ends when fire destroyed timber supports.

New grade is opened in 1955 along rocky bluffs of Columbia River near The Dalles, Oregon to relocate 14-mile stretch of Spokane, Portland and Seattle main line track. Relocation, to some 16 feet above old route, was required because of reservoir created by construction of The Dalles Dam.

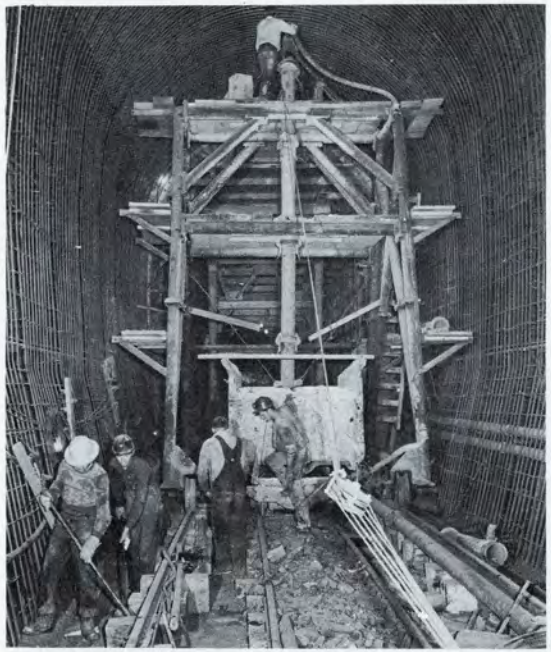
Permanent M-K crushing plant at Granite, Wyoming, supplies high-quality ballast to Union Pacific. One of the largest such facilities in the U.S., the plant has been grinding away continually for a quarter of a century.



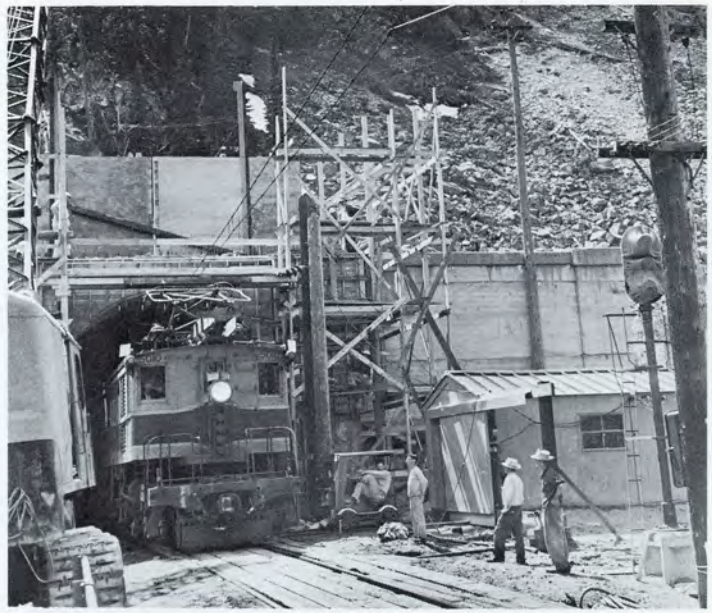
Dozers beef up shoulder of Missouri Pacific line in Texas during continuing program of grade improvements covering more than 400 miles to date.

This tunnel of 'Frisco' line near Winslow, Arkansas, was enlarged and lined with concrete by M-K in 1967.

Four months of high-speed work, including more than a half-million cubic yards of earthmoving, completed this cut to eliminate a tunnel for the UP on the outskirts of Boise, Idaho.



Triple-deck jumbo is employed to line Altamont Tunnel in Wyoming with two feet of heavily reinforced concrete. Lining operations completed double-track main line for the Union Pacific from Omaha to Salt Lake City. At right, a UP diesel inaugurates service through the 6,700-foot-long tunnel in 1949.



Great Northern electric engine emerges from 7.8-mile-long tunnel (longest railroad bore in the western hemisphere) in the Cascade Mountains of Washington during installation by M-K of a tunnel ventilating system that was designed by International Engineering Company, Inc., San Francisco-based subsidiary of M-K.

First lift of ballast goes under ties during construction of 16-mile line between coal-fired power plant and coal mine, near Casper, Wyoming.

Ballast is unloaded along yard trackage built by M-K as part of site work at new steel mill (U.S. Steel's Texas Works) near Houston.

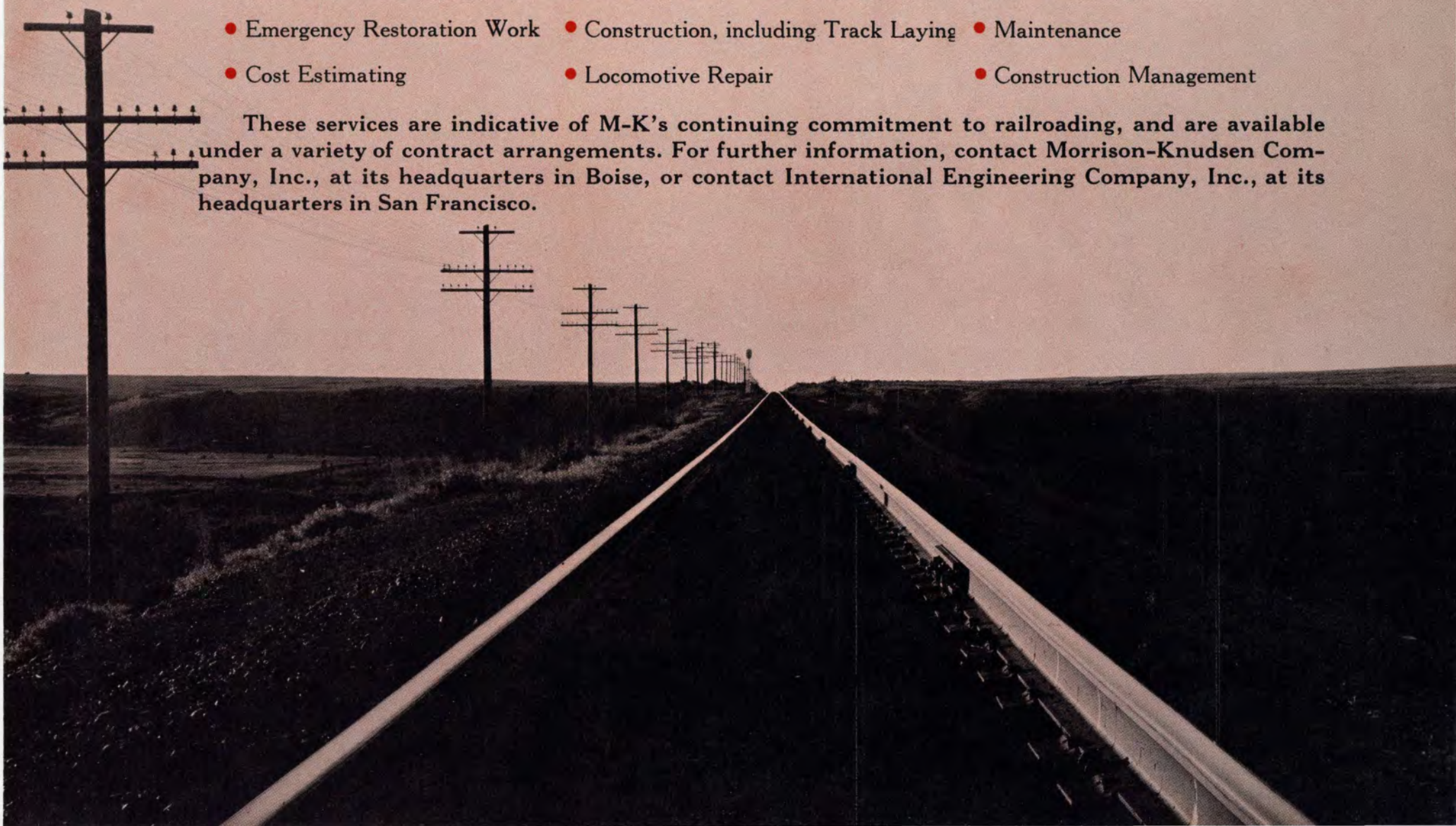
Two big line changes of the 1950s were 44-mile relocation project (left) near Williams, Arizona, for The Atchison, Topeka & Santa Fe that cut as much as an hour from freight timetables by providing reduced grade and 42-mile relocation job (below) near Cheyenne for the Union Pacific that reduced grade up Sherman Hill from 1.55 percent to .82 percent.

During more than half a century of railroad construction and engineering operations, M-K has gained a worldwide reputation for competence, integrity and high-speed performance. It has consistently completed projects on, or ahead of, schedule and, with such specialized subsidiaries as International Engineering Company, Inc., comprises an integrated design, engineering and construction organization that is capable of handling any railroad assignment.

This total capability is available under a "turnkey" concept which may include any or all of the following services:

- Planning, Feasibility Studies
- Complete Engineering and Design
- Procurement
- Emergency Restoration Work
- Construction, including Track Laying
- Maintenance
- Cost Estimating
- Locomotive Repair
- Construction Management

These services are indicative of M-K's continuing commitment to railroading, and are available under a variety of contract arrangements. For further information, contact Morrison-Knudsen Company, Inc., at its headquarters in Boise, or contact International Engineering Company, Inc., at its headquarters in San Francisco.



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