

Modern Railroads

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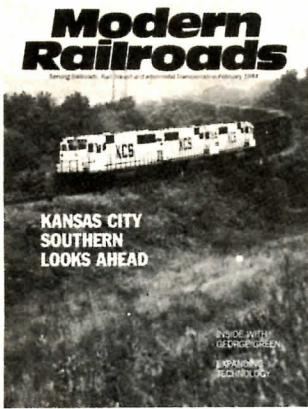


**KANSAS CITY
SOUTHERN
LOOKS AHEAD**

INSIDE WITH
GEORGE GREEN

EXPANDING
TECHNOLOGY

Modern Railroads



Behind three of its latest SD-50 locomotives, a Kansas City Southern freight, bound for Shreveport, passes an Armco Steel plant just south of Kansas City. (KCS photo)

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Coal is delivered to the Welsh, Texas power plant of Southwestern Electric Power Co., via KCS' subsidiary Louisiana & Arkansas line. Almost unknown on the KCS system until the mid-1970s, coal now provides nearly a quarter of the system's revenue. (SWEPCO photo)

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RAIL-ORIENTED TRAFFIC BASE HELPS AS KCS SEEKS TO STAY INDEPENDENT

Coal unitrains have joined petroleum, chemicals, paper products in Kansas City Southern's strong traffic base. Ten years of steady investment have greatly improved the road's physical condition, operating efficiency.

"We intend to continue as an independent and profitable railroad."

That firm statement by Chairman and President Thomas S. Carter pretty well sums up how they look at the railroad situation these days at the Kansas City Southern lines.

Like many U.S. railroads, the 1,664 route-mile KCS system experienced a traffic turnaround during 1983. That turnaround, combined with continued tight cost control and improved operating efficiency, enabled the railway system to post a gain in net income last year—\$25.1 million vs \$21.6 million in 1982.

KCS Lines is the largest unit in Kansas City Southern Industries, Inc., a company that also has major interests in financial services, telecommunications, manufacturing and real estate. KCSI also reported improved earnings for 1983—\$41.8 million, compared with \$39.6 million in 1982 on a consolidated basis.

All 1983 figures reflect the adoption of depreciation accounting by the railway: 1982 figures are re-stated to be comparable.

The KCS rail system includes two major components. The KCS itself runs 786 miles from Kansas City straight south to Beaumont and Port Arthur, Texas, the latter named after the road's founder, railroader/entrepreneur Arthur E. Stilwell. The main line of the largest KCS subsidiary, the Louisiana & Arkansas, runs about 500 miles from New Orleans to Farm-

By Tom Shedd



A large user of concrete ties, with 165,000 in track, KCS is able successfully to spot the concrete ties in the track along with existing wood ties. (KCS photo)

ersville, Texas and 38 miles more via Santa Fe trackage rights into Dallas. KCS and L&A cross at Shreveport, La., where Deramus yard, built in 1956 to replace separate KCS and L&A yards, is the operating hub of the system.

Stilwell envisioned the railroad that later became KCS as the shortest, cheapest route for grain and other midwestern products moving to tidewater; but it's doubtful if he or anyone else had any real conception of the tremendous development of petroleum, chemical and forest industry that would take place in the Texas-Louisiana Gulf Coast area.

Today one of the strongest foundation stones of KCS system traffic is the materials for and products of the refineries and chemical plants that surround the Gulf Coast ports it serves—Port Arthur, Beaumont, Lake Charles and New Orleans—and that line the Mississippi river between New Orleans and Baton Rouge.

Forest products—lumber, wood, pulp and paper products—are another major element in KCS system traffic (a large new paper mill opened recently at Mansfield, La.); and unitrain movements of coal have become very important to the system since the mid-1970s. Such shipments to four utility companies totaled 12.6 million tons and over \$80 million of revenue in 1982. Intermodal traffic, much of which moves via the "Big D" route between the Santa Fe connection at Dallas and New Orleans, is growing. Export grain traffic improved in 1983, but was still below the level reached before President Jimmy Carter's grain embargo in 1980.

IMPROVED RAILROAD. For much of its history, the KCS system had been noted for being a well-maintained, efficient property; but by 1973, when Tom Carter became president, it needed rebuilding and modernization. Since then a continuing program of upgrading the system's track, roadway, structures, signaling, communications and equipment has been in progress.

At Lake Charles, La., KCS Chairman and President Tom Carter, left, and Senior Vice President Marketing Mike McClain pose beside a huge refinery tower that had just moved via special train over the KCS from the Riley-Beaird plant in Shreveport, La.



In 1982, for example, the system replaced 409,000 crossties, applied 487,000 tons of ballast, installed 159 track miles of continuous welded rail, lined and surfaced 2,483 miles of track (including yard tracks and sidings), improved 240 road crossings and installed 168 sets of switch ties.

"We have concentrated on welded rail," Tom Carter explains. "We hope to have the entire system in CWR before long." The welded rail program began shortly after he became president. As of the end of 1983, more than 800 track miles of main-line CWR was in service, and a 1984 CWR program totaling another 170 miles is proposed. Some 554 miles of the KCS main line between Kansas City and Port Arthur already has it, as does the entire Texas subdivision of the L&A from Shreveport to Farmersville. This year's program will fill in most of the remaining gaps on the KCS line to Port Arthur.

"When I came here, the Texas line had 85 or 90-lb rail and every joint was loose," Carter recalls. "Mike McClain (now senior vice president, marketing), had just sold a unitrain to SWEPCO (Southwestern Electric Power Co., for a power plant at Welsh, Tex.) and I knew we'd never

get that train over the line. Now the Texas line has all CWR and I would say that 80 percent of the ties and 100 percent of the ballast has been replaced."

KCS finally began using imported rail in 1980—some Canadian chrome rail from Algoma—after being disappointed with the performance of a domestic head-hardened rail. Although considerable rail corrugation has occurred under coal unitrain traffic, Carter is reluctant to grind the rail for fear of destroying its work-hardened surface. "We use the grinding train very sparingly and selectively, and we run Brinnell hardness tests ahead of the grinder and behind it," says John H. Hughes, vice president executive department, who also has jurisdiction over maintenance of way.

With 165,000 concrete ties in track, KCS has the highest percentage of concrete ties of any U. S. railroad except Florida East Coast. And defying conventional wisdom, KCS successfully spots concrete ties among existing wood ties. It obtains the concrete ties from Lone Star-KC Concrete Tie Co., a joint venture owned by KCSI and Lone Star Industries. It uses a KCS-developed H-shaped tie

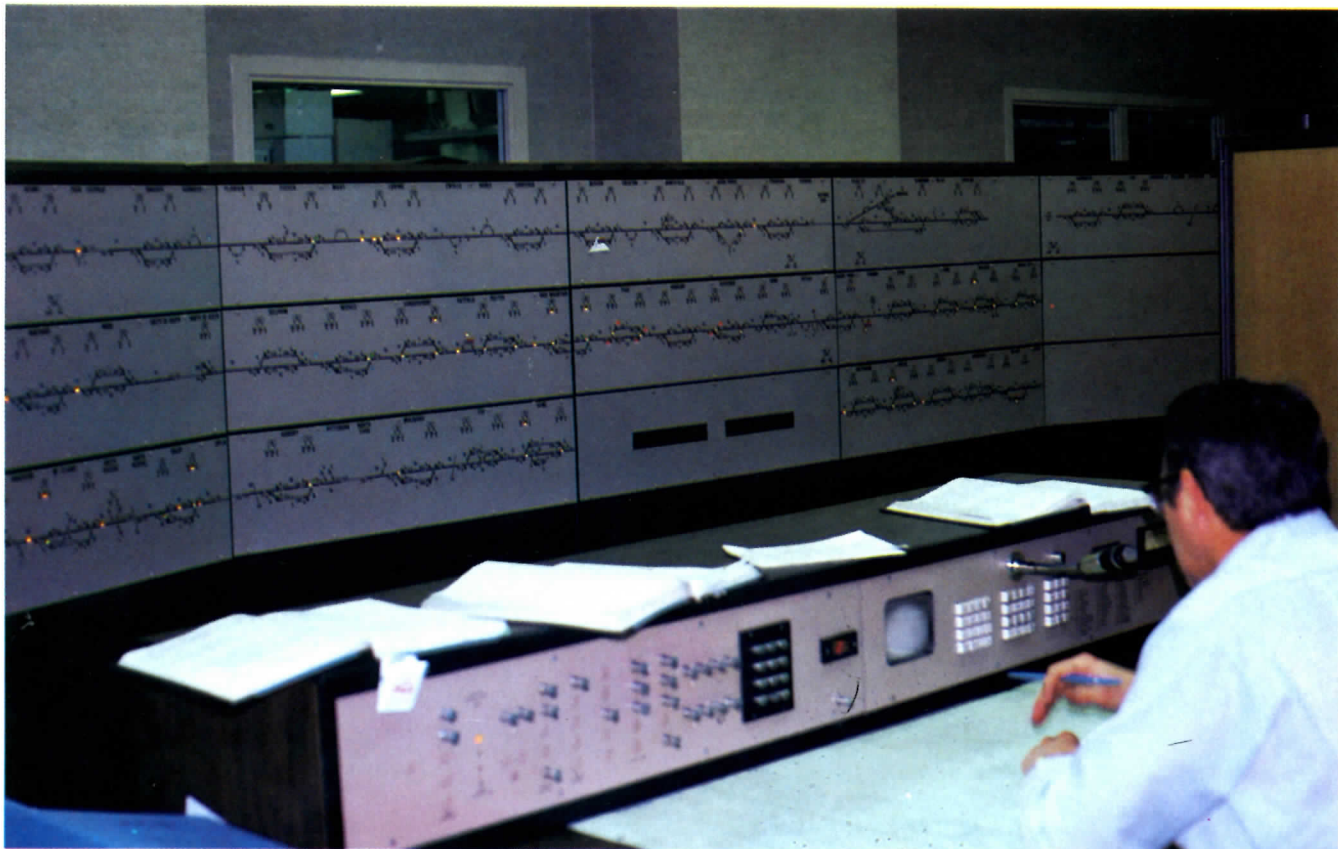
pad which is restrained by the hold-down insert from working out from under the rail; and a patented hold-down insert that uses Pandrol clips.

"We go through two active swamps in the Mississippi Valley," Carter explains. "Wood ties were lasting under 15 years there, so we were forced to consider concrete. We intend to replace all our wood ties in the swamp areas."

KCS has also put a high priority on reducing the number of track structures and the cost of maintaining them. In 1982 alone it replaced 17 open-deck timber bridges with concrete and steel structures. "We've eliminated 50 percent of the structures," says Carter, "and where a structure has to be maintained we put in a ballast deck or a beam span. We've also built three orthotropic steel bridges—two of which have won design awards."

What about line changes? "We've made only three changes since I came here, and they had already been designed, on the Texas line. There is one 10 degree curve on the KCS that I'd like to get rid of, at Lanagan, Mo., but we'd have to cut down a granite mountain to do it."

Two dispatchers working at Union Switch & Signal consoles in Shreveport control the entire KCS system operation. Control codes move via microwave; there are no line wires left on the railroad.



CTC ALL THE WAY. Not only is the KCS main line almost entirely laid with welded rail, but it also operates almost entirely under Centralized Traffic Control, all the way from Kansas City to Beaumont. In addition, CTC will be completed this year on the entire Texas subdivision of the L & A, from Farmersville into Shreveport. With that completed, the road will begin to put traffic control on the rest of the L & A main line between Shreveport and New Orleans, where there is now some 75 miles of automatic block signaling.

KCS installed its first CTC in 1944, a GRS system between DeQuincy, La. and Beaumont, Tex. Today, two dispatchers, seated at modern US&S consoles in the Shreveport office building, control the entire system. One handles the Kansas City to Shreveport segment, while the other dispatches the KCS to Port Arthur and Lake Charles plus the "dark" territories. The original DeQuincy-Beaumont segment is still controlled by an operator at Beaumont. KCS also uses some Harmon equipment.

NO LINE WIRES. CTC control codes travel entirely by microwave—there are no line wires left anywhere on the system. All other KCS communications—voice and data—also use the system, which has 1,500 mi of 6 kmc microwave and 1,000 mi of 9 kmc to trackside points. The system uses space diversity to enhance reliability.

Nerve center of the communications system, as well as the CTC system, is in the equipment room at the Shreveport office building. There, on a recent visit, we found three generations of Motorola equipment in operation: from early solid-state equipment to the MR 600 type of the early 1970s to the latest Starpoint 6000 which was being installed. Much of the data transmission over the system is at 19.2 kilobits per second.

The microwave system is actually owned by LDX Network, a unit of KCSI's Telecommunications Group. The entire microwave plant is continuously monitored for operation and security by a computer-based system that records any activity at any of the equipment locations.

EFFICIENT EQUIPMENT. The KCS system fleet of 320 locomotives and about 7,000 freight cars is in excellent condition. The locomotives—painted white with large reflective red initials—are all EMD models, ranging from early F-type carbody units to the latest GP-40s, SD-40-2s and SD-50s. A number of the older units have been converted into slugs by removing the engines and weighting them to 260,000 or 265,000 lbs. Four of the slugs have cabs and controls.

"By limiting our fleet to EMD we simplify repair procedures and minimize inventory, since many of the parts on various EMD models are interchangeable," explains J. B. Rogers, assistant vice president, mechanical. Recently the road acquired 19 used SD-40s. In excellent condition, they were placed in service immediately, and significantly upgraded the locomotive fleet at relatively modest cost.

All heavy locomotive maintenance and overhauling is done at the Shreveport shop, which is well-lighted and equipped with overhead cranes, a

Built by its own personnel, locomotive washer at the Shreveport shop does an efficient job of keeping KCS power looking good.



Whiting drop table for truck changing and a Stanray wheel truing machine, as well as a modern test and spectrographic analysis laboratory. A recently added, well-equipped running maintenance shed allows complete servicing of a number of units simultaneously under roof, without having to move the units during servicing. About 50 units a day are serviced.

Seventy of the system's higher-powered locomotives have been equipped with Sentry TM fuel savers, supplied by American-Coleman, another KCSI company. Recently, the road began to equip locomotives with Pulse on-board data recorders; a playback unit at the Shreveport office permits data from locomotive tapes to be charted and analyzed any time an unusual incident or problem occurs in the operation of an equipped locomotive. KCS is also using a Freightmaster Train Dynamics Analyzer, a computerized train operations simulator, in the training and re-training of locomotive engineers.

Locomotive maintenance records are, of course, completely computerized. The complete maintenance history of any locomotive unit may be called up on a CRT or printed out. The computer also keeps a running

record of all locomotive parts having serial numbers.

The Shreveport car repair shops include a spot-repair rip track with a Joy car puller; the rip track handles 15 to 20 cars daily and works seven days a week. The shop for heavy car



KCS Lines' 1,664 route mile system is in top physical condition. Its the shortest route to tidewater for grain and other midwest products. Chemicals, petroleum, paper products and coal provide a strong traffic base.

repairs and program work is 300 ft long with a 30-ton overhead crane that spans five tracks. Car maintenance records are also computerized, and all drawings are on microfilm. All shop offices have recently been remodeled and new locker rooms for the car shops were completed in 1982.

The system stores facility is also part of the Shreveport shop complex. It supplies 15 outlying maintenance points through monthly shipments in special boxcars. A 5,000 sq ft addition to the storeroom now stocks stationery and computer forms. Nearby, the system wheel shop turns out 100 to 140 wheel and axle sets a month.

OPERATING CENTER. About 30 to 35 road trains are operated daily on the KCS system and about half of them come into Deramus yard at Shreveport. This flat switching yard has eight long receiving tracks (in addition to the main line and passing track), 31 classification tracks and eight storage tracks. It switches 1,500 to 2,000, sometimes 2,500 cars a day. Running the yard and terminal requires 19 switch jobs per day, six or seven per shift.

Switch locomotive axle is machined at the system wheel shop in Shreveport. Meeting the needs of the entire railroad, the shop produces about 100 to 140 wheel-axle sets per month.



Computerization of many aspects of operations as well as freight billing and accounting procedures is well advanced at KCS Lines. When the computer produces the conductor's wheel report for a train leaving Dera-mus yard, it reads the STCC codes for all loads and prepares a listing of the hazardous materials in the train, with the location in the train and the procedures required in case of an emergency. The computer also prints out a train profile for the engineer, showing the location and weight of each car in the train as an aid to handling the train.

All freight billing for the entire system is done in a computerized office at Shreveport, where billing clerks work at CRTs in semi-private cubicles. Customers call a toll-free number to the billing office. The clerk takes down the information, verifies it with the customer, assigns a waybill number and enters the data into the computer. About 85 to 90 percent of the shipments tendered this way are rated within 45 seconds and the freight bills are in the mail the next day—a help to cash flow. Many KCS shipments are repetitive; and the system automatically enters repetitive waybill information via the main com-

puter in Kansas City.

That computer is an IBM 3033-U, which supports the railroad's on-line system. Also in the computer room at the railroad office building in Kansas City is an IBM 3032, which serves as a backup for the 3033 and also supports stand-alone batch, applications development and personal computing. Forty 3380 and 12 3350 disc drives provide direct access storage for 26 billion characters of information; 16 additional 3380s are to be installed this year. A 3080 is on order for 1984 delivery.

"We are leading the way in billing and accounting," notes James E. Judge, vice president and manager corporate systems. "We have had a number of other railroads in to look at our car billing and operating systems."

DIFFICULT FUTURE? No question that today Kansas City Southern Lines is profitable, efficiently operated, well managed and in steadily improving physical condition. But what of its future as a relatively small, regional carrier in a deregulated environment and faced on all sides with large-scale mergers of connecting and competing railroads?

Looking at the future from a background of nearly 38 years with KCS, Senior Vice President Marketing Mike McClain suggests that it's not going to be easy for any railroad, large or small. "But it will become still more difficult for the smaller roads," he believes.

An eventual Southern Pacific-Santa Fe merger could be expected to have an effect on KCS. It could affect the interchange of traffic with the Santa Fe at Dallas, not to mention the north-south traffic now interchanged with SP and Shreveport and Lake Charles.

It is conceivable that one day KCS may be swallowed up by one of the super-systems; the risk of trying to stay independent is considerable. But for now, KCS is healthy; and the coal traffic that now produces 24 percent of the system's revenue has good potential for further growth.

Says Mike McClain, "We serve a lot of rail-oriented industry. Thank God for that!"

MR