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CSXT RUSSELL KENTUCKY

CONTINUOUS RAIL WELDING PLANT

CSXT'S RUSSELL KENTUCKY
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Located just north of CSXT's Russell Kentucky Yard is CSXT's Russell, Kentucky, continuous rail welding (ribbon rail) plant. This facility is operated under contract by Progress Rail Services. The Russell plant is one of the five such continuous rail welding plants operated by Progress Rail in the United States. These five plants all perform DC powered flash-butt welding under partial climate controlled conditions. Each of these plants can efficiently join together a variety of rail lengths and poundage into a quarter mile long length of rail. The ribbon rail leaves the plant by being loaded onto a quarter mile long rail train.

The continuous rail welding plant at Russell was opened in 1964 by Hall's Electric. In 1969, the plant was contracted to Holland Company who operated the facility to 1976. Since that date, Chemetron (A Subsidiary of Progress Rail) has operated the plant. In February 2014, Progress Rail opened a new continuous welding plant at Russell. This plant, the newest in the world, uses proprietary equipment in producing its ribbon rail. The plant operates on a four-day schedule, with two 4-hour shifts, 5:30 AM to 4:00 PM and 4:00 PM to 12:30 AM.

The Russell Continuous Rail Welding Plant receives both new rail and old rail for joining into 1,440-foot lengths of ribbon rail. All ribbon rail produced at the plant is made out of either all new rail or all old rail. New rail is 136-pound rail obtained from either of two domestic suppliers or six overseas suppliers. Old rail processed at Russell is 115, 122, 132, 136 or 140 -pound rail salvaged when rail is replaced or a line is taken up. Two types of ribbon rail are produced at Russell: Premium Hard Head and Intermediate Hard Head. All the new rails received at Russell have manufactured reporting marks imprinted into both sides of the rail telling who manufactured the rail, on what date, and the rail's properties. The rail also has attached to it stickers that repeat this information in both printed and bar codes. These bar codes are read as the rail moves through the continuous welding machine to ensure that the proper rail is being used and to provide inventory control.

The continuous welding plant at Russell is laid out in a west to east direction. Within the plant, all electrical lines are carried in overhead trays bolted to the ceiling, while all hydraulic lines run in trenches within the floor. New rail at the Russell Plant arrives by rail car in 80-foot lengths at the north side of the plant. Each car carries between 3,000 and 4000 feet of rail. The rail is off loaded here by a rail mounted overhead crane, which stacks the rail in piles until ready for use. Each pile contains some 1100 -1300 pieces of rails stacked. When the 80-foot lengths of rail are to be welded into ribbon rail, the crane picks up nine 80-foot lengths of rail and moves them to the rail loading table. Two nine rail bundles of 80-foot length rail will produce a 1,440-foot section of ribbon rail. The rail from the loading rack is fed into a conveyor belt that holds one rail at a time. The rail, once on the conveyor belt, will be fed through five stations as it travels eastward.

The first station the rail encounters is an automatic buffer wheel enclosed in its own climate controlled building. The buffer will polish all sides of the rail for 8-inches from its end. Both ends of the rail are polished to clean the rail of any foreign matter to ensure a perfect weld. The next four stations are in the welding building. The first station in the building is the welding

station. Here hydraulic rams force the incoming rail with the previous rail into near perfect alignment in all axis. Then 200-ton hydraulic pressure is applied to both rails to force their ends together. Once the two rails sit flush with each other, the DC arc welder applies its heat to weld the two rails into one. Once the weld is made and the shear ram has removed the excess slag from the weld, the hydraulic pressure is released. The operator then uses a set of slag tongs to remove the waste slag that has built up around the weld.

Once clear of the welding station, the welded rail now moves eastward through the welding building to an automatic base grinding station where a grinder wheel removes the excess weld from the base of the rail. From the automatic base grinding station, the rail, with its weld, moves to a weld hand grinding station where two individuals, using hand powered tools, grind and polish the head and web of the rail's weld to a smooth surface. From here the weld moves to an inspection station where the rail weld is inspected for any visible or hidden flaws and hydraulic rams are used to move the weld into tolerance. Then a mag particle inspection is performed and, if an imperfection is found, the rail with its weld is sent back to the welding station. Here the bad weld is cut out and rewelded.

Just outside of the building east of the inspection station, a hydraulic staffa motor is used to pull the welded rail eastward into a string of ribbon rail cars. As the rail is fed through the string of railcars by a rail guide shoe, it is tracked by a person on the ground to ensure that the rail threads itself through the correct series of rail holders. Once loaded on the train, the ribbon rail is secured in the center car of the train by steel hold down plates. At this time, each rail has its end painted in either blue or red paint to signify its hardness: Premium Head Hard Rail has blue paint applied to its end, and Intermediate Head Hard Rail receives red paint. Plant production is such that it can dispatch every three work days a train loaded with 57,600 linear feet of ribbon rail.

Used rail arriving at Russell Continuous Welding Facility follows a slightly different path to be converted into ribbon rail than does new rail. Used rail comes to the facility by rail car in various lengths or as continuous welded rail that has been picked up from alongside the track. Stick rail is off-loaded by overhead crane and placed in stacks like new rail for future processing. If the rail comes into the plant on a rail train, it is processed through a series of conveyors and grading tables as it is sawed up. However, often stick rail is damaged at its ends from the shock of rail cars rolling over it, and ribbon rail is damaged from being cut free from its adjacent rail. Therefore, all used rail must be inspected for flaws and run through the circular friction saw shed where damaged ends are removed before entering the welding facility loading table. All bolt holes and defects are removed from used rail prior to welding. The minimum length, after cropping ends of used rail for rewelding, is 27 feet.

An overhead view of the Russell Continuous Rail Welding Plant

Signage on the side of the CSXT office building wall

A view of CSXT's Continuous Rail Welding Plant at Russell. On the left is the overhead crane with the rail loading platform beneath it. The building in front of the crane contains the automatic buffer wheel. The blue line running from left to right is the rail conveyor belt. The low building on the right is the Progress Rail office building, and the tall narrow building in back of the office building is the welding shop. Off to the right is the ribbon rail train that is being loaded with 1,440-foot rail. The CSXT oversight office is out of view to the left beyond the crane.

Signage on the Progress Rail office building wall

A view eastward into the old rail holding and welding facility. The building in the background holds the cutting saw while the building in the foreground holds the welding machinery.

The overhead crane moving into position to pick up new rail for delivery to the rail holding table. In the foreground is a stack of old rail.

The traveling crane is preparing to pick up nine rails for transport to the loading table.

The nine sticks of rail being placed on the rail holding table

An overall view of the rail holding table. Individual rails are fed off to the right to a conveyor belt to carry them to the automatic buffer wheel building.

A view from the automatic buffer building along the rail conveyor belt toward the welding building

A view of two rails moving along the rail conveyor belt

A close-up of one of the scannable bar reading codes on a rail. These bar codes contain inventory information.

Setting the computer that controls the automatic buffer and manages the production run of the rail through the various stations. No photo was allowed of the automatic buffering station in operation.

The rail welding machine. Hydraulic rams are being used to aline the two rail butts to each other.

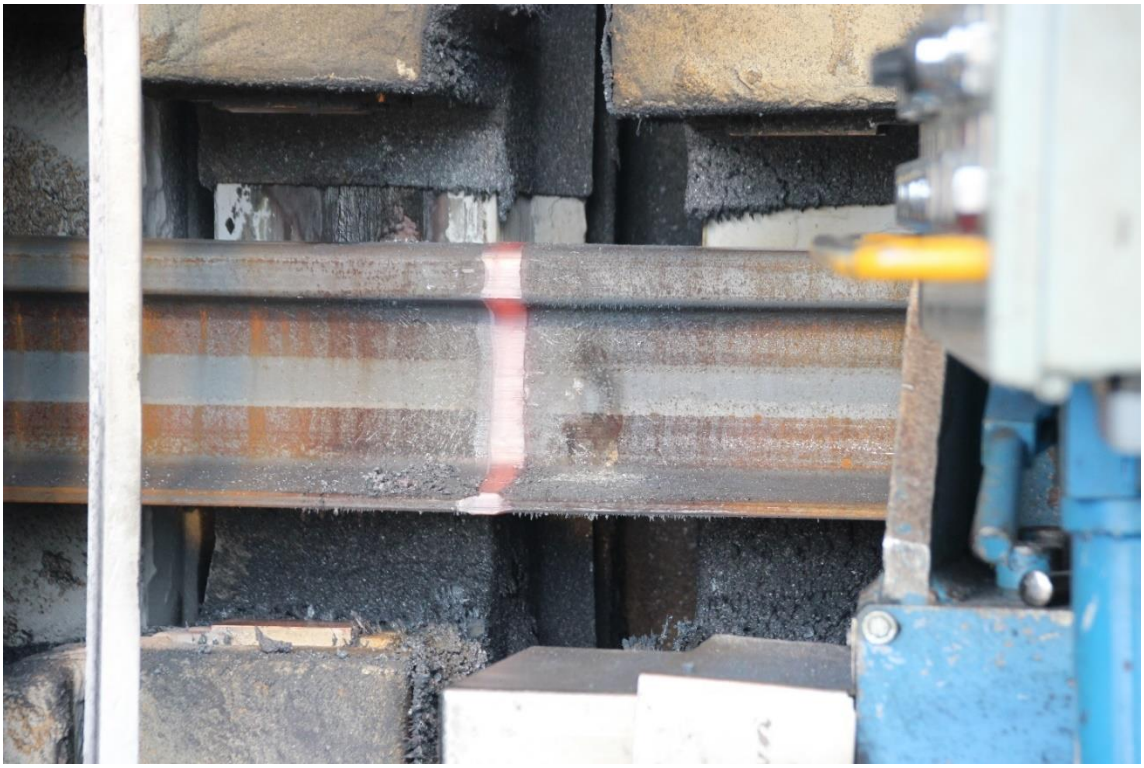
The weld is started.

The welding machine welding the two rail butts together. This operation takes 15-seconds.

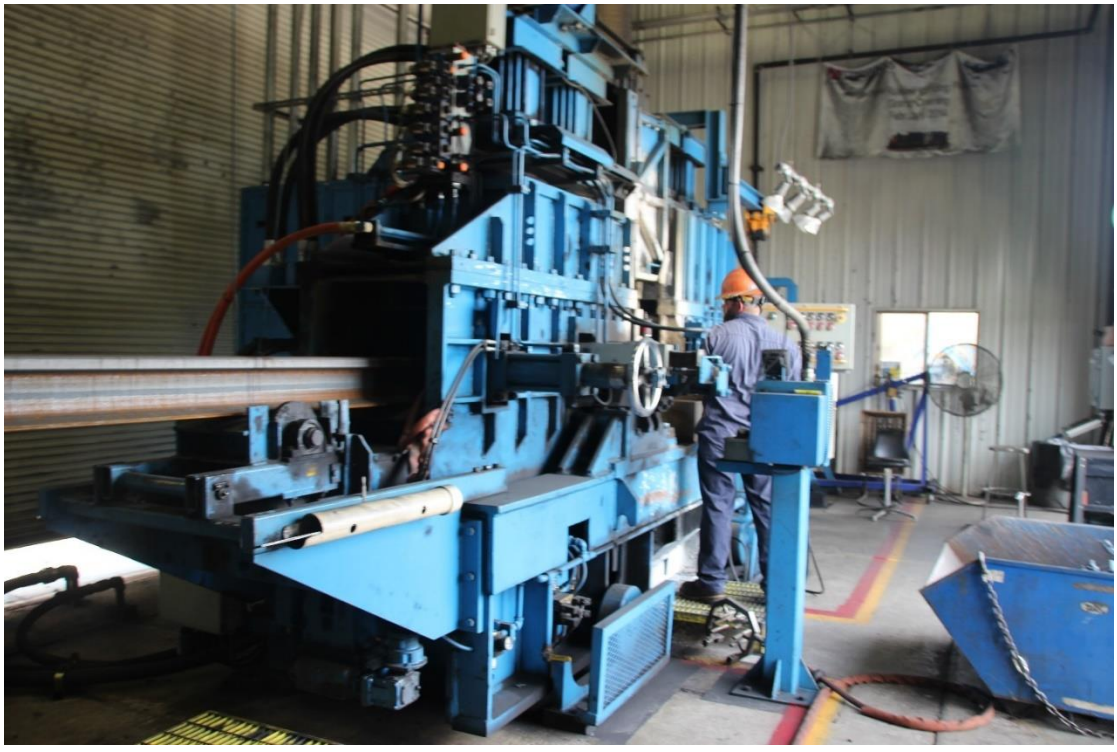
Slag being pulled away from the newly welded rail joint

The slag from over 500 welds rests in a scrap collecting basket.

A computer read-out giving the welding machine operator information on the weld just completed. If later a rail is returned due to a defective weld, management will check to see if the information concerning the defective weld was out of sync with the normal welds.



A view of the newly completed weld



An overall view of the welding machine

A view from the automatic rail base grinding staion toward the welding machine

A view into the automatice rail base grinding machine. Sparks fly as excess material is roughly ground off the weld.

A view from the automatic rail base grinding station toward the hand operated buffering station with the inspection station in the distance

A view of the weld hand grinding staion

The rail joint after it leaves the hand grinding station

The rail inspection station. The operator is applying flux to the weld to insure that it is a full weld. If the weld does not pass inspection, it will be sent back to the welding machine. A two foot section will be cut from the rail at the weld, one foot to each side of the flawed weld. The rail will then be rewelded and journey back through the automatic rail base grinding station, the hand grinding station, and the inspection station.

Hydraulic ram pressure being applied at the inspection station to the weld area to insure that the rail does not sag or hog at the welded joint

The come-along machine that moves the ribbon rail out of the welding building and onto the ribbon rail holding cars

A view of the ribbon rail moving from the welding building into the rail carrying cars

The ribbon rail being automatically loaded onto the ribbon rail car fleet

The ribbon rail being guided into the rail carrying car

An end view of the newly welded rail on board the rail car. The rail ends are painted blue to indicate that they are Premium Head Hard rails.

A view of 25% of the rail car train length as seen looking toward the rail welding shop. The rail rides freely in these cars on rollers and is not anchored in place.

A view of the remaining 75% of the length of the rail carrying train looking toward the locomotive

Located at the center of the rail ribbon train is an anchor car on which is mounted an A-frame topped with chairs for holding Maintenance-of-Way personnel responsible for controlling the release of the ribbon rail when it is laid.

A view of the old rail welding facility looking toward the rail cutting machine building

A view of the rough ends of the old rail before being trimmed in the rail cutting room

A view of the interior of the old rail circular cutting saw building

Stored next to the ribbon rail plant were two rows of steel coil covers. The covers were all marked CSX, Conrail or Chessie.