The traffic engineering division at the City of Little Rock, Arkansas, recently developed a solution to the following challenge. The observed problem was that an intersection located at 65th & University Avenue, was being gridlocked by vehicles making a southbound left turn during periods when trains were present on tracks. The problem occurred because the left turn continued to be serviced causing traffic to back into the intersection effectively blocking all other movements (see diagram).

The solution seemed simple: Railroad traffic should preempt the intersection; a signal needed to be sent from the railroad crossing to the traffic controller at the intersection. The problem, however, was location of equipment. As the railroad crossing signal would have to be picked up on the eastern side of the tracks, a means had to be found to pass the signal to the traffic controller, west of the tracks. The railroad engineers were opposed to the installation of conduits under the rails of this crossing, so a hardwired solution was not applicable.

The Use of Contact Closure Radio for Railroad Preemption
By: Mahlon Fiske, General Foreman (Signals), City of Little Rock

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Southbound left-turning traffic grid locking the intersection
The Use of Contact Closure Radio for Railroad Preemption . . .

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After discussions with the railroad it was determined that wireless preemption would be the best solution. The City of Little Rock makes extensive use of ENCOM Wireless serial radios, the predominant application is controller interconnect. The railroad crossing provides a contact closure type signal, so the ENCOM 4528 transmitter and ENCOM 4028 receiver for wireless contact closure signaling were selected.

The radio equipment was obtained, programmed and first tests were conducted in the signal shop. The tests verified that this system would function as designed in the field.

Using an ENCOM Site Survey Kit, the City of Little Rock quickly determined antenna locations. Because the City of Little Rock is using wireless communications at this location, the antenna for the preempt was installed lower than the existing antenna and polarized vertically to minimize the likelihood of interference. In addition, the new contact closure radios were programmed with a unique frequency hop pattern to distinctly separate the two wireless applications (see photo with two antennas).

Implementation

A cabinet was constructed to house the contact closure transmitter utilizing a standard Arkansas Fail Safe Preempt panel configured to operate with radio, while providing the standard function of a wired preempt. The cabinet was fitted with a 10-amp circuit breaker and GFIC outlet to provide power for the radio and was built in a cast aluminum pole mount utility cabinet shell. Further tests were conducted in the shop to verify correct operation of the entire system. The completed unit was then installed on an existing luminaire pole and connections made to power and to the relay provided by the railroad.

Pole mounted cabinet with the ENCOM model 4528 contact closure transmitter (lower right corner)

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The contact closure receiver was installed in the traffic control cabinet and Output #1 was wired to the preempt input of the control unit to supply a logic common.

**Conclusion**

This System has been in place for several months and has proved to be a reliable and cost effective alternative to installing wire. This configuration provides failsafe operation. Failures in the system will place the signals into preempt requiring a response from the troubleshooter. The construction and installation proved to be straightforward and can be accomplished by two skilled technicians in about two days.

Special thanks go to Ray Archer and his fellow technicians for their assistance in successfully constructing and deploying this system.