DATA SHEET

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Title:	**TRACK WARRANT CONTROL & DIRECT TRAFFIC CONTROL**
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INTRODUCTION

For over 100 years train movements were governed by Time Table and Train Orders (TT&TO, see Data Sheet D8h and D8i) in which the dispatcher issued orders when necessary to modify or override the established train schedule. Orders were sent to line side operators who delivered them in written form to passing train crews and reported train passage back to the dispatcher.

By the 1970's train radio had made direct communication practical between the dispatcher and individual train crews, while station closings rendered line side operators few and far between and wholesale passenger train discontinuances left few if any schedules on the timecard. The train-order system was cumbersome and not well-suited to radio communications.

TRACK WARRANTS

An answer to these problems was the Track Warrant Control (TWC) system which came into widespread use with acceptance of the General Code of Operating Rules in the early 1980's. TWC is suitable for both non-signaled lines and automatic-block-signaled trackage (but would not be used in CTC territory or within yard limits). While prototypical for modem railroading, it is close enough to traditional train order terminology for comfortable use by steam-era modelers. The track warrant is essentially a "fill-in-the-blanks" train order whose use is covered by a relatively few simple rules, which makes it very suitable for use on a model railroad. The specific forms vary from road to road and have been simplified for use in a model environment as shown in the sample below.

Track Warrant **No._____**

To:_____ Train # _____ ____ 19 ____

At:_____

1.___ Track Warrant No. ___ is void.
2.___ Proceed from _____ to _____
3.___ In effect after # _____ arrives _____
4.___ Hold _____ track at _____
5.___ Do not exceed _____ MPH.
6.___ Flag protection required.
7.___ Other instructions _____

_____

OK _____ M Dispatcher _____
Reported clear at _____ M by _____

TRACK WARRANTS - continued

Train crews carry a supply of blank TWC forms with them and contact the dispatcher by radio when they are ready for authorization to use a particular section of trackage. The dispatcher directs them to copy a track warrant, gives them a warrant number, and tells the crew to "check" the applicable numbered boxes and fill in the appropriate blanks. The crew then repeats the warrant back to the DS indicating which boxes they've checked and repeating verbatim any blanks that were filled. If correct, the dispatcher gives an "OK," the time and his initials, which the crew copies and repeats back for acknowledgment. With that the train is authorized to carry out the warrant instructions including occupying the main track and running to the prescribed point. When the train reaches the limits of the warrant the crew again contacts the dispatcher for a new warrant, in which the DS will first cancel the previous warrant (only one warrant is in effect at a time for a given crew).

The limits of a track warrant may be specific stations, switches, or mileposts on a specific track. When a station is named as the "from" location, authorization begins at the last siding switch ("leaving switch"), or the station sign if there is no siding. Normally the "to" location indicates the first siding switch (or station sign if no siding), but the authority can be extended to the leaving switch if the warrant specifies "hold main track" at the last-named point.

Warrants usually confer exclusive occupancy of the named territory but may authorize joint use by more than one crew, in which case trains must be instructed to flag (protect against each other) or to proceed only at restricted speed (slow enough to stop before encountering another train).

As with TT&TO, the dispatcher must keep a record of outstanding warrants and territories in which trains are authorized. Nowadays the prototypes do this by computer, but modelers can make do with a simple track-diagram worksheet.

DIRECT TRAFFIC CONTROL

A few roads (C&NW and SP were two) opted for DTC rather than TWC, feeling that DTC was simpler and easier to change over to and to train dispatchers and crews to use. It was also believed by some to be inherently safer, especially in the early '80's when computers were not available to help control train movements and check for overlapping warrant limits.

DTC is similar to TWC except that it uses less verbiage and is less time-consuming and easier to use in the field. Chances of error are less due to elimination of the need to choose various options from the preprinted TWC form. The only disadvantage is that DTC uses fixed named blocks, defined by block signs located in the field, and is thus somewhat inflexible in being limited to the defined block limits.

Blocks were normally assigned from one station to another, usually with an active siding for meeting of trains. Generally blocks would begin/end at one end of the siding or the other, depending upon which direction trains usually took the siding. For example, if northbound trains normally took siding, blocks would begin/end at the south end of sidings. This allowed the southbound train to pull up to the south end of the siding on the main, and the northbound train

DIRECT TRAFFIC CONTROL - continued

to enter the siding without needing additional block authority.

DTC authority is issued verbally by the train dispatcher via radio directly to the conductor of the train (or the engineer only if he is not operating a moving locomotive at the time of transmission). DTC authorization is issued in three modes:

1. Directional movement in one direction only.
2. Sole work and time limits (block to be occupied by only one train or MOW [maintenance of way] crew, who may move in either direction within the defined limits at timetable speed).
3. Joint work and time limits (block occupied by more than one crew who may move in either direction at restricted speed and must protect against other movements).

Printed forms are not used. Issuance must adhere to the following format:

Dispatcher: "(Engine) (direction) with engineer (name). You are authorized to proceed (direction) in one block (block name) [or] (number of) blocks (block name) to (block name). Over."

Conductor: "(Engine) (direction) with engineer (name), I am authorized to proceed (direction) in one block (block name) [or] (number of) blocks (block name) to (block name). Over."

Dispatcher: "(Engine) (direction) that is correct. Take siding at (siding name) [when applicable]."

Similar verbiage is provided for release of blocks, "after-arrival [of train so-and-so]" authority, work-and-time, etc.

DTC is well-suited for use on a model railroad. Block signs can be placed on the layout at the proper locations so operators can easily identify their location and quickly learn the railroad geography. Many operators already use radio headsets so they only have to adapt the proper procedures to accurately replicate DTC. With DTC verbiage being considerably less than with TWC and with no forms to carry and complete, DTC fits more easily into the fast-clock, hands-full model railroad environment.

More detailed explanations and illustrations are provided in the following:

"Track Warrant Control on the CATS" by Ron Williams, Model Railroader, August 1992, p. 68.

"Track Warrants" by Wayne St. Davids, Model Railroading, August 1993, p .48.