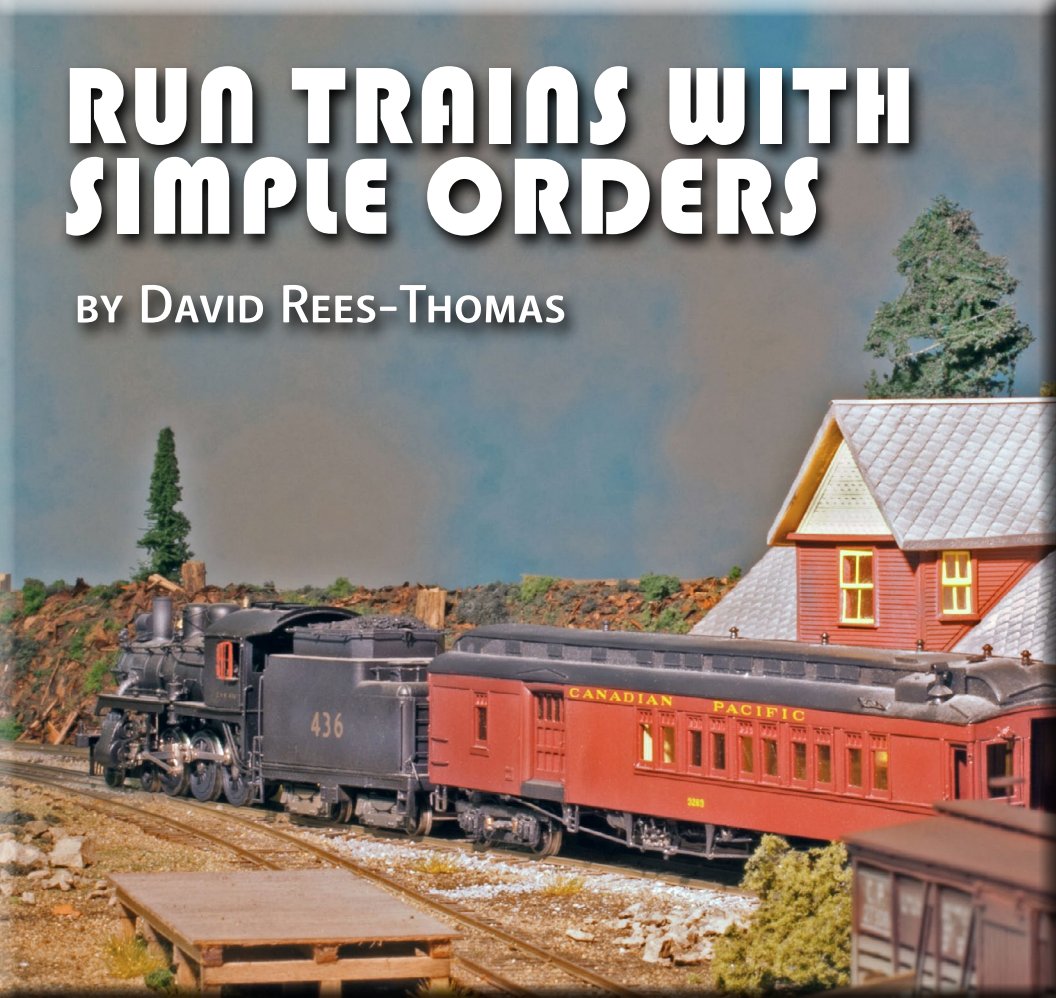


# RUN TRAINS WITH SIMPLE ORDERS

BY DAVID REES-THOMAS



1. With rear-end and Form W orders and clearance OK'd, train 385, the Cap local, is ready to depart Capilano on time.

*David Rees-Thomas photo*

**Examples show how to move traffic efficiently ...**



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## TALKING ABOUT TIME TABLES

David Rees-Thomas, a former operator on the Ontario Northland, has written about his experiences getting trains over the road using the time table and train order dispatching system. His experiences are rooted in Canadian railroading, but the basic principles apply to most North American TT&TO systems.

“The Basics of Time Tables and Train Orders” at the end of the story, was heavily condensed by contributing editor Joe Brugger from an instruction sheet *MRH* copy editor Mike Dodd wrote to help out crews on his former Virginian Railway.

Each of Mr. Rees-Thomas’s scenarios sets up a real-life situation, and then shows the rules and orders that were applied. A page from an Ontario Northland Timetable from 1974 is included as a reference.

“A timetable is published, and train crews are required to follow the schedule exactly. This works well, but a fixed schedule doesn’t allow for unusual occurrences ... in response, railroads developed train orders.”



**ACCURATE REPRESENTATION OF TIMETABLE AND** train order operation is becoming increasingly popular on model railroads. Mark Dance recently had a two-part article published in *Railroad Model Craftsman* and posted an excellent video on the *Model Railroad Hobbyist* forum at [mrhmag.com/node/17490](http://mrhmag.com/node/17490).

The orders modeled most often seem to be meets (Form A) and run extras (Form G), followed by time orders (run lates and waits) in Form E. And deservedly so. These orders involve interaction with other crews and require careful attention to timetable and superiority of trains.

But let's look at some lesser-known orders that, outside of signaled territory, could turn out to be at least as common in real life.

### 1. Form U - Relief of flag protection

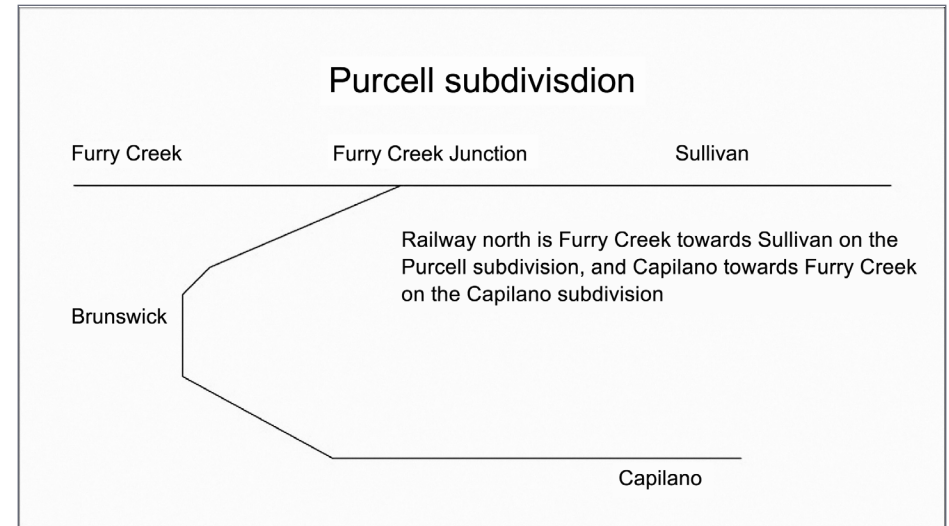
You've probably heard reference to Rule 99, the flagging rule. It's a long rule that takes up two and a half pages in my 1962 Canadian UCOR (Uniform Code of Operating Rules) but the gist of it is this:

*"When a train stops under circumstances in which it might be overtaken by another train, a flagman must immediately go back a sufficient distance to ensure full protection ..."*

"A sufficient distance" can turn out to be a fair hike, more than a mile if there's a downgrade behind you. Not very tempting early on a cold snowy morning. Even less tempting if you know there's no possibility of another train for hours, but you still have to do it.

You're conductor on #385, the Cap local, which leaves the town of Capilano at 0515 every weekday to meet the southbound passenger, #46, at Sullivan on the Purcell Subdivision (all mythical - see [2]). Let's see what the dispatcher can do to make life a bit easier for you and your crew.

Sometime before 0500 the dispatcher phone rings at Capilano, rousing the operator out of a brief nap.



2. The Purcell Subdivision covers the line from Furry Creek to Sullivan. The Capilano sub meets it at Furry Creek Junction.

"Capilano"

"Morning, Cap - guess we can fix up the local - R north 5"

"NS".

The operator rolls five sheets of Form 19 into the typewriter, types the letter 'R' in the space after the words "Form 19," and quickly puts in today's date [3]. He responds "NS" (no signal) because Capilano is the originating station for train 385, so no train-order signal is displayed. As a terminal, Capilano doesn't even have a train order signal.

Order No 211 is addressed to "Northward trains." The familiar U.S. "C&E" doesn't appear in any of my Canadian rulebooks, but they all contain wording like: "Train orders addressed to trains and engines must be regarded as addressed to conductors, engine-men, and pilots ..." Train orders could be addressed to operators (Opr) and yardmasters as well as trains and engines.

## RUN TRAINS WITH SIMPLE ORDERS | 5

Looking at the body of order 211, it doesn't seem all that different from an ordinary Wait At, but it is. Look at a Form E, train order No. 227 in [4]. One way to look at it is to ask who really benefits from each order. In the case of the Form E (TO 227), it isn't train 225, the train being restricted, is it? His scheduled leaving time is 1510, but his train isn't going to be ready until 1600 today. Order 227 might benefit an *opposing extra train*, however, by giving it a bit more time to get into town.

Form 19 R	
Train Order No 211	
December 20 19 74	
To	At
Northward trains	Capilano
Northward trains except	
No 385 Eng 436	
Wait at Capilano	
Until Nought nine ten	0910
TWS	
Repeated at 04 42	
Made COM	Time 04 42
Opr Thomen	

3. Completed train order No. 211 looks like this.

## RUN TRAINS WITH SIMPLE ORDERS | 6

Looking again at order No 211, the rear-end order, we see the train that really benefits from the order is #385. The conductor of #385 knows that *if he has to stop* for some unexpected reason he doesn't need his trainman to flag the rear of his train, at least not for a few hours.

Another rear-end order is No 231 [5]. The dispatcher might well add a couple more lines to order No 231 [5] to save having to issue yet another order when 231 is fulfilled:

Form 19 R	
Train Order No 227	
December 20 19 74	
To	At
No 225	Capilano
No 225 Eng 3107	
Wait at Capilano	
Until Sixteen ten	1610
MCC	
Repeated at 14 35	
Made COM	Time 14 36
Opr Petrin	

4. Order 227 holds 225 to open a window of opportunity for an opposing train at Capilano.



This order is annulled  
At Nineteen twenty 1920.

## Form W - Train order check of trains

Ok, we have rear-end protection for #385. Does he need anything else before the dispatcher gives him his clearance? Yes, he does.

Form 19 R	
Train Order No 231	
December 20 19 74	
To	At
Northward trains	Capilano
Northward trains except	
No 225 Eng 3107	
Wait at Capilano	
Until No 225 Eng 3107	
Arrives at Furry Creek Jct	
MCC	
Repeated at 15 40	
Made COM	Time 1541
Opr Petrin	

5. The body of the rear-end order can be written another way, as this order shows.

#385 originates at Capilano, on the Capilano sub. He terminates at Sullivan, on the Purcell sub. Time table and special instructions give us a local version of Rule 83A.

*"All trains from the Capilano Sub, before fouling main track Purcell Sub, must know that all overdue superior trains have arrived and left."*

Train 385 is a first class train, so we only have to look for first class schedules on the Purcell. Last night's 386 is OK, because he's in the register at Capilano. Yesterday's 385 is long since dead (i.e., his schedule is more than 12 hours old). What about the 46 and 47, the southward and northward passenger runs on the Purcell sub?

The 385 can't leave Furry Creek Jct. before 0540. Number 46 isn't due out of Sullivan before 0620. The two are due to meet at Sullivan anyway, so if we're on time he's not a problem. But what about the 47 of last night, due to leave Furry Creek at 2030? 47 is a problem: his schedule isn't dead for another three hours.

But surely we know 47 fulfilled his schedule last night? Train 386 met 47 at Sullivan. The crew on 386 is the same crew bringing 385 back this morning. Don't they know 47 is past Furry Creek Jct.?

Well, no, they don't. No one at Capilano could "know" about 47 unless (a) they actually saw 47 arrive at Capilano (which of course it can't), or (b) they read it in the train register at Capilano (where it isn't), or (c) they got the information from somebody who does know. The person who knows is the train dispatcher, who has the information on the train sheet. Let's see how the dispatcher can tell 385 he's clear to enter the Purcell Sub.

Before 385 can proceed north toward Sullivan, he needs a clearance on the Purcell Sub. Here's what the timetable echoing Rule 83D, has to say about that:

## RUN TRAINS WITH SIMPLE ORDERS | 9

*“Unless otherwise instructed, all trains from Capilano Sub proceeding to the Purcell Sub may leave Furry Creek Jct without obtaining clearance, but must obtain clearance at Furry Creek.”*

Order No 212, a Form W, [6]. gives 385 that information. Given the yard limits at Furry Creek Jct, and knowing there are no superior schedules in effect, the 385 can enter the Purcell Sub at Furry Creek Jct., back down on Furry Creek station to obtain

Form 19 Y		
Train Order No 212		
December 20 19 74		
To	At	
No 385	Capilano	
No 47		
due to leave Furry Creek Jct		
Thursday December 19th		
has left Furry Creek Jct		
TWS		
Repeated at 04 43		
Made COM	Time 0443	Opr Thomen

6. Order 212 clarifies the status of train 47.

## RUN TRAINS WITH SIMPLE ORDERS | 10

his clearance, and pick up any passengers for Sullivan before proceeding northward on the Purcell sub.

Now we're ready to go!

*“Capilano clear No 385 on orders 211 rear-end, 212 Form W, no more.” “OK 0444 TWS, and 46 is on time.”*

With that the Capilano operator makes up two sets of orders, staples a clearance to them, and hands them to the conductor so 385 can depart on time for Furry Creek Jct and Sullivan.

At this point it may have occurred to you that 385 might just be delayed. It wouldn't take much before the whole thing would fall apart. train 46 would be waiting in Sullivan to transfer passengers from 385, but 385, inferior by direction, wouldn't be able to obtain clearance to travel on the Purcell Sub. Most likely, the dispatcher would give 385 a Right Over Form C [7] to get him into Sullivan.

A meet order, Form A, is not allowed because Sullivan is 385's terminating station. If 385 was *really* delayed, he'd have to wait on the Capilano sub while the conductor walked over to Furry Creek to pick up the order and clearance.

The corresponding order at Sullivan would be issued as a 19R addressed to both No 46 and the operator (Opr). The order would be given to Sullivan and repeated by the operator first, because that is where the superior train is being restricted. The last line (*“This order to No 46 at Sullivan”*) alerts No 385 to approach Sullivan at restricted speed.

Can we get a train from the Capilano sub onto the Purcell sub without always having to get a clearance at Furry Creek? The words *“unless otherwise instructed”* suggest we can. Recall that such trains *“must know that all overdue superior trains have arrived and left.”* The dispatcher provides that information with another Form W - Train Order Check of Trains. If we're setting

## RUN TRAINS WITH SIMPLE ORDERS | 11

up No 225, the Fourth Class northward half of the Cap turn from Capilano to Sullivan, what trains concern us?

No 224, the southward half of the Cap turn, also Fourth Class, will be in the register at Capilano. Note that even though it's the same engine and van and same crew and it's the only train in town, the conductor of 225 doesn't "know" 224 has arrived without checking the register.

Form 19 Y		
Train Order No 214		
December 20 19 74		
To	At	
No 385	Furry Creek	
No 385 Eng 436		
Has right over No 46 Eng 3602		
Furry Creek Jct to Sullivan		
This order to No 46 at Sullivan		
TWS		
Repeated at 0536		
Made COM	Time 0537	Opr Thomen

7. A Right Over order supersedes timetable superiority of trains.

## RUN TRAINS WITH SIMPLE ORDERS | 12

No 385, the northward passenger to Sullivan, shows in the register as having departed Capilano, but that's all we "know" about 385.

Of No 46, the southward passenger on the Purcell sub, we know nothing, even though he's in the register at Furry Creek.

Form 19 Y		
Train Order No 229		
December 20 19 74		
To	At	
No 225	Capilano	
All first and third class trains		
Due to leave Furry Creek Jct		
Before Fourteen Twenty 1420		
Friday Dec 20th have arrived and left		
No 223 may leave Furry Creek Jct		
Without obtaining clearance		
MCC		
Repeated at 1433		
Made COM	Time 1433	Opr Petrin

8. Train order 229 gives #225 the last bit of authority it needs to depart from Capilano.



Similarly, we have no knowledge of No 325, a northward Third Class due out of Furry Creek at 0714. Here's one version of the Form W that No 225 needs before he can go on the Purcell sub [8].

Order No 229 actually combines two examples of Form W. The first satisfies the "all overdue superior trains" condition. The second deals with "unless otherwise instructed," allowing No 225 to proceed directly from Furry Creek Jct to Sullivan on the Purcell sub. With this order, a rear-end, and a clearance, No 225 is on his way to Furry Creek Jct and Sullivan.

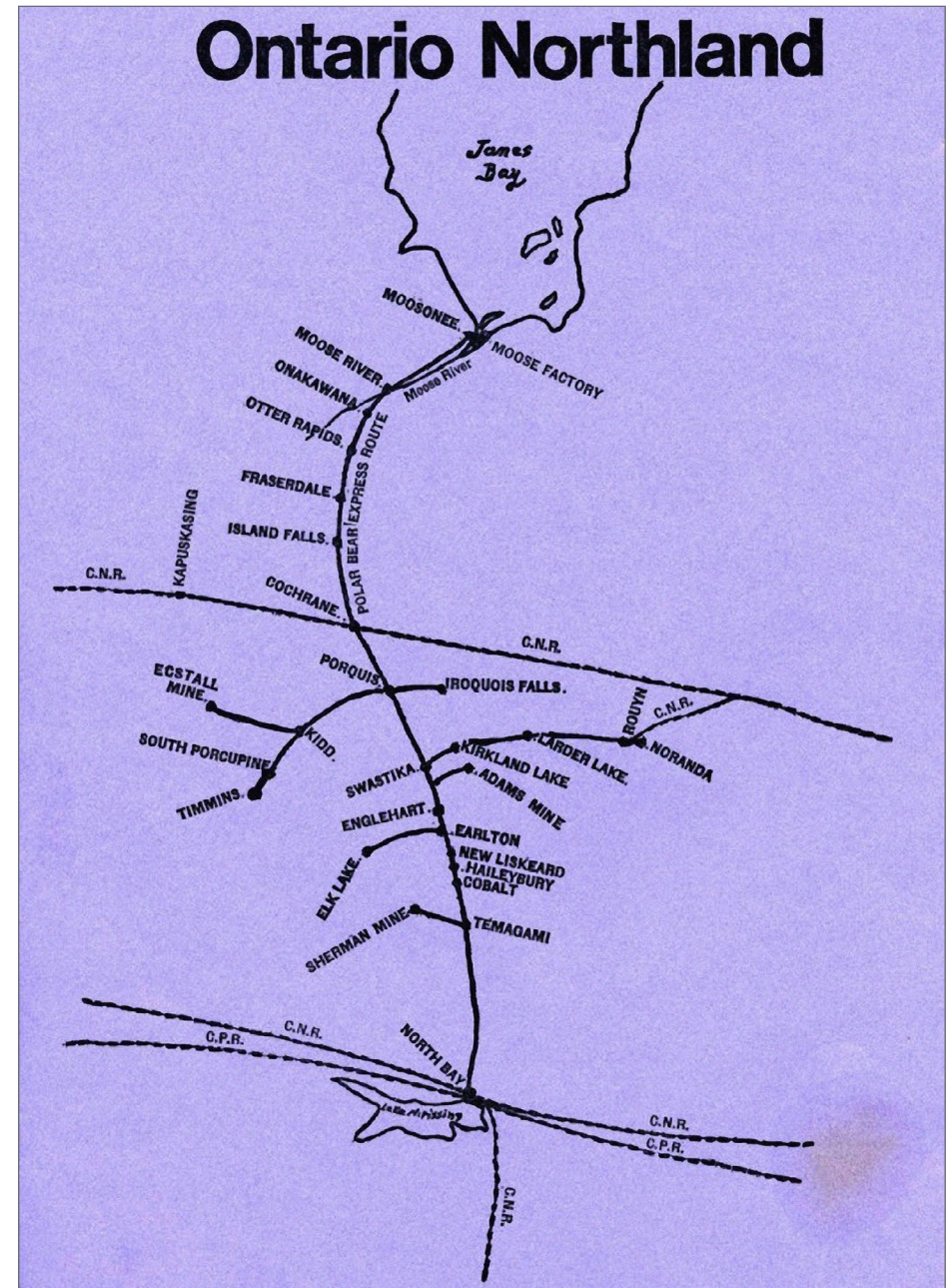
Other Form W examples provide for exceptions:

All regular trains...  
...have arrived and left  
Except No 325

or an extra which has superiority by virtue of a meet, wait, or right-over:

Extra 436 South  
Has arrived Capilano  
On train order No Two Ten 210

Why the last line? There could be more than one Extra 436 South on a given day, each created on a separate train order. That line ensures that we're talking about one specific Extra 436 South. Other Form Ws require a train to register at a station, allow it to leave a station without registering, or to check a register for arrival of an extra train under certain conditions. And finally



9. The Ontario Northland Railway.

## RUN TRAINS WITH SIMPLE ORDERS | 15

there is a Form W that permits a train to register without stopping at a register station.

### Extra 3628 South May register at Furry Creek By register ticket

The register ticket is about the size of a clearance form, and is printed on pink paper. It lists the station, date, train and engine, the names of conductor and engineman, and signals displayed (green or nil). The times of arrival and departure are shown, along with loads, empties, and tons – all of the information required to register the train. The conductor fills out the register ticket and hands it to the operator as he rolls by. The operator completes the register when he does the OS.

**RULE 83A REMINDS US: A TRAIN MUST NOT LEAVE its initial station on any subdivision ...until it has been ascertained whether all trains due which are superior have arrived or left.** Normally the conductor will find this information in the train register. Where there is no register it must be conveyed by train order. Form W – Train Order Check of Trains – does the job. The rear-end order (Form U) saves the crew from flagging unnecessarily should they be delayed en route.

### Form G and Form F - Bring 'em home early

Train order Forms F (sections) and G (extra trains) are much better known, but you may not have thought of using them this way. Have you ever been in the situation where you wanted to run a regular train *ahead* of schedule? It happens on the prototype occasionally. Here are a couple of tricks I learned on the ONR.

## RUN TRAINS WITH SIMPLE ORDERS | 16

NORTHWARD TRAINS INFERIOR DIRECTION						Station Numbers	Miles from Elsewhere	Yard Limits	PURCELL SUBDIVISION
FOURTH CLASS	THIRD CLASS		SECOND CLASS	FIRST CLASS					STATIONS
225 Freight Daily ex Sat & Sun	325 Freight Daily ex. Sat			47 Psgr Daily	385 Psgr Daily ex.Sun				
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	5.34		.....	19.08	From Capilano Sub				.....GIBBONS.....P.....
From Capilano Sub	6.02			19.38					.....MORLEY.....P.....
	6.45			20.14					.....PURCELL.....P.....
	7.14			20.30		5.40			.....FURRY CREEK....PR.....
15.37	.....	.....		.....	.....				.....FURRY CREEK JCT....PZ..... Junction with Capilano Sub.
16.00	7.27			s2044 20.47	6.00				.....SULLIVAN.....CKPWZ.....
.....	8.21		.....	21.12	.....				.....TALLIS.....P.....
.....	8.52		.....	21.35	.....				.....TAVERNER.....P.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

PURCELL SUBDIVISION NOTES

:

:

:

FURRY CREEK JCT

The normal position of the junction switch is for Purcell Subdivision.

FURRY CREEK

All northward trains from Capilano Subdivision may leave Furry Creek Jct without obtaining clearance but must obtain clearance at Furry Creek unless otherwise instructed. Unless otherwise instructed, southward trains to Capilano Subdivision must obtain clearance at Furry Creek but may leave Furry Creek Jct without obtaining clearance.

Conductors on No 46, 47, 325, and 326 may register by register ticket.

10. A page from Ontario Northland Timetable #63 (1974) shows schedules and special instructions.



## RUN TRAINS WITH SIMPLE ORDERS | 17

Back in the day, Ontario Northland used to run two freights daily except Sunday between Timmins and Englehart, Ontario [9, 10]. No 308's job was to handle traffic from the Texas Gulf Sulphur mine at Kidd Creek: copper concentrate for Noranda, lead-zinc concentrate for Sudbury, and the occasional unit train of sulphuric acid. No 326 was more of a way freight, handling various local jobs between Timmins and Porquis, then disappearing into Iroquois Falls for a couple of hours to work the Abitibi Paper mill.

Now from time to time there might be very little work for 326 in Iroquois Falls, or even no work at all. No 326 could be ordered late out of Timmins, but that would get him home to Englehart at the usual time. The dispatcher could make the crew a lot happier by bringing them home early, especially when there's a Stanley Cup game on TV to look forward to. What tools does the dispatcher have that would do the job?



11. No 385, in Furry Creek yard limits, backs down to the station to pick up his clearance.

## RUN TRAINS WITH SIMPLE ORDERS | 18

If you said, “run him as an Extra Train,” you have one answer [12]. What else does the dispatcher need to do to make that work? Giving him right over opposing extra trains is one step.

There are two opposing northward schedules, No 223 and No 225. 223 is superior to No 326 by class, but No 225 is inferior by

Form 19 Y		
Train Order No 231		
December 19 19 74		
To	At	
Eng 1601	Porquis	
Eng 1601 run extra		
Porquis to Englehart		
with right over northward extra trains		
HJP		
Repeated at 14 33		
Made COM	Time 1433	Opr clancy

12. Order 231 helps to move #225's train ahead of its regular schedule.

## RUN TRAINS WITH SIMPLE ORDERS | 19

direction. We need to knock down No 326's schedule [13] so 225 won't be expecting to meet a train that isn't there.

That's one way to get No 326 home early. It still leaves the dispatcher with the possible need to arrange meets, and it doesn't give track workers and other trains any schedule information.

Form 19 Y		
Train Order No 232		
December 19 19 74		
To	At	
No 326 opr	Porquis	
No 326 Due to leave Porquis Thursday December 19th is annulled Porquis to Englehart HJP		
Repeated at 14 33		
Made COM	Time 1433	Opr Clancy

13. Order 232 allows opposing traffic to ignore the regular schedule for train 326.

## RUN TRAINS WITH SIMPLE ORDERS | 20

There's another way to do it *if* there's a suitable schedule available. In this case there is: No 308.

Let's say No 326's train is ready to leave Porquis before No 308. We'll make him First 308, green flags and all [14], and the "real" 308 will become Second 308.

Form 19 Y		
Train Order No 237		
December 19 19 74		
To	At	
Eng 1601	Porquis	
Eng 1601 display signals and run as First 308 Porquis to Englehart HJP		
Repeated at 14 33		
Made COM	Time 1433	Opr Clancy

14. The train will now run on an earlier schedule as First 308.

## RUN TRAINS WITH SIMPLE ORDERS | 21

As the final section Second 308 does not display signals [15].  
Ultimately this is less work for the dispatcher as both trains will be operating on timetable schedules. The annulling order is still required, and the dispatcher may decide to put a run-late on Second 308.

Form 19 Y	
Train Order No 238	
December 19 19 74	
To	At
Eng 1734	Porquis
Eng 1734 run as Second 308	
Porquis to Englehart	
HJP	
Repeated at 14 33	
Made COM	Time 14 33
Opr clancy	

15. As the final section, Second 308 does not need to display signals.

## RUN TRAINS WITH SIMPLE ORDERS | 22

It doesn't really matter which actual train runs as the first section of 308 and which the second. It is essential that whichever runs as First be available to receive its assignment and clearance before any later section is cleared.

There you have two possible ways to run a regular train "ahead of schedule". You can annul the original schedule and treat the train as an extra, paying due respect to the fact that, in the absence of further orders, he has no right or superiority.

Alternatively, *if* you have the time to set it up, you can run your train as a section of another schedule and take advantage of the superiority already granted by the timetable.

In my experience, Ontario Northland tended to run multiple sections if they could, particularly for movements such as CNR detour trains. Find the method that works for you, but in any event, you've added some more tools to your train-order toolbox.

And if you really want to know what timetable and train-order operation is all about, your best source is Dave Sprau and Steve King's *19 East, Copy 3*, published by OPSIG, the Operations Special Interest Group.

### 19Y, 19R, and 31, eh?

Form 19R? What's this all about ? Don't we have just Form 19 and Form 31? In the earlier days that was indeed true. Form 31 was used to restrict right or schedule "in every case where a train carrying passengers is concerned" (and in a few other cases all of which required the signatures of conductor and engine-man.) Form 19 was used for most other purposes, some of which required the train be brought to a stop (Red signal). Others allowed the order to be collected on the fly (Yellow signal). In the latter case, a two-indication train-order signal would be set to Stop, supplemented by a yellow flag or lantern.



Under Canadian rulebooks prior to 1962, before transmitting an order the dispatcher was required to “send the symbol” ‘31’, ‘19R’, or ‘19Y’ followed by the direction to each office addressed, as in “19R north copy 3”. By the time the 1962 Uniform Code of Operating Rules (UCOR) was published, Form 31 had disappeared, with 19R taking over most of its applications. An order restricting a train carrying passengers no longer needed signatures before it could be repeated, although an order annulling a work extra still did. The operator now wrote or typed the letter ‘R’ or ‘Y’ after the words “Form 19”, responding with “SD (Signal Displayed) R North”, “SDY South”, or “NS” (No Signal) as appropriate.

I have based this article on the Canadian UCOR 1962, because that was the rulebook in effect when I was actually getting paid to copy train orders. Your prototype or period may differ in details, but the basic ideas will be the same. ☒

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## THE BASICS OF TIMETABLES & TRAIN ORDERS

The goal of every railroad is to move traffic over the line efficiently and safely. There are several ways to control train movement, but the most basic is a fixed schedule of trains. A timetable is published, and train crews are required to follow the schedule exactly. This works well, with two exceptions: A fixed schedule doesn’t allow for unusual occurrences such as breakdowns or bad weather; and some seasonal or expedited freight movements aren’t very compatible with regularly-scheduled trains.

In response, railroads developed train orders. A train order contains direct instructions from the railroad dispatcher to a train crew. It might grant the crew authority to run an extra train not listed in the schedule, might direct the crew to meet another train at a designated station, or cancel (annul) a scheduled train entirely.

In addition, train crews need a clearance when leaving their initial station and at any station where they receive a train order. A clearance verifies that the crew has received all the orders it is supposed to receive.

A train order conveys authority upon a train crew to perform a movement that is not covered by the timetable. Train orders are used to create extra trains, annul scheduled trains or change their times, arrange meets between trains, and so forth.

If every train were listed in the timetable, and nothing unusual ever occurred, train orders would be unnecessary. But that’s not how things work. Train orders give the dispatcher the flexibility to react to current circumstances, and keep the railroad running smoothly.

Train crews learned this system by experience, often working the same routes and jobs day after day. New crew members would

learn from experienced railroaders in the days of five-man crews. Modelers are handicapped by operating less frequently.

How does this all work? Each crew member must carry a copy of the timetable and the rule book. The rules are written to answer questions raised by operating situations and are designed to make the railroader's work safe and efficient.

Crews of trains listed in the timetable run the train according to the published schedule. Crews of trains not listed in the schedule (extras) run their trains according to train orders they receive. When any train passes a station, its crew looks at the train order signal. If the signal indicates "Stop," they stop the train to pick up orders and a clearance.

The dispatcher controls the railroad. If a situation arises that can't be safely handled by following the timetable schedule, the dispatcher dictates a train order to an operator at a station. The station operator sets the train order signal to "Stop," then writes the order. When the train arrives, the operator gives copies of the train order and a clearance to the appropriate crew members.

## DAVID REES-THOMAS



David was born in Vancouver, British Columbia, Canada in 1945. He was hooked on wind-up trains by age the age of 4. David attended Queen's and University of Waterloo in Ontario in the 1960s, and met and married Judith, who also enjoys riding passenger trains.

In 1974 they moved to northeastern Ontario where he walked into a job as a spare operator – "telegrapher" officially, although the key and sounder were

long gone – with the Ontario Northland. He remained with the ONR for four years, mostly staying on the spare, or extra, board for the variety it offered. Then, prompted by a newly-acquired amateur radio license, he went back to school in electronics technology.

In 1981, David and Judith moved to Canada's west coast where he wound up teaching embedded systems at BC Institute of Technology for 20 years. In 2005 they retired to Saturna Island (pop. 325), not far from Victoria, with their Coast 34 sailboat. Apart from model railroading and sailing, he operates a small water taxi and serves as an attendant with his local volunteer ambulance service.



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