Operate your layout using a prototype timetable

How to adjust time and distances for model railroad use

By Tony Koester • Photos by the author

I model the 1950s, a time when the movement of trains by timetable and train-order rules was still common. The employee timetable included train schedules along with special instructions supplementing the book of rules, which was each railroad's bible. Train orders could amend the timetable – say, to tell all concerned that a superior train was now to run an hour late, thus helping opposing trains keep moving against it, or to authorize an extra (unscheduled) train.

The key is that all trains moved in relation to the schedule – as published or as amended – in the timetable. Unless they had an order that gave them right over a scheduled train, an extra train's crew had to find holes in the schedule that allowed them enough time to move between stations without interfering with a scheduled train.

Since the railroad I'm modeling operated under timetable and train-order rules, I needed to publish a timetable that my dispatcher and crews could use as the basis for train movements.

All the trains, only part of the run

I wanted to run the entire schedule of trains the Nickel Plate Road ran on the part of the line I model in HO scale. The NKP's Clover Leaf District Timetable 68, of Sept. 26, 1954, shows two first-class passenger trains (9 and 10) and 10 second-class freights, including a local that ran westbound only. I knew the NKP commonly ran sections of its hot freights to handle extra traffic, not to mention the occasional extra, so this timetable was clearly the place to start.

But there was a snag. The timetable showed all 25 stations along the Third Subdivision that I model, but I'm modeling only 10. Also, this subdivision's 113-mile length was much more than the roughly 8 scale miles of main line I have in my basement. Obviously, a train leaving the west end of the Third Sub at Charleston, Ill., would arrive at the east end, Frankfort, Ind., a lot sooner than its full-size counterpart!

That's where fast clocks come in. A fast clock operates at a speed faster than a normal clock. A 6:1 clock counts off six hours in the space of one. You can purchase fast clocks from several manufacturers, including Rail-Lynx (www.rail-lynx.com) and GML Enterprises (www.thegmlenterprises.com).

For me to model the actual running time from one end of the subdivision to the other, I'd need a 14:1 clock (113 actual miles divided by 8 scale miles, from the example above). However, experience on my old HO scale Allegheny Midland and other model railroads suggested that 6:1 was about as fast as I wanted the little clock hands whirling around the dial. Experience on railroads such as Bill Darnaby's Maumee Route strongly suggested that slower ratios, no faster than 3:1 (one scale hour equals 20 minutes of real time), allowed more time for yard switching and both issuing and reading train orders. So 3:1 it was.

The basis for safe and efficient train movements over Tony Koester's HO scale Nickel Plate Road is the employee timetable. Here a late-running No. 98, left, waits in the siding as passenger train No. 9 leaves Linden, Ind., "on the advertised" at 1:11 a.m. Since distances are compressed, Tony uses a 3:1 fast-clock ratio, and revised the times shown in NKP Timetable 68 except at the main terminal in Frankfort, Ind.

Adapting the timetable

The first chore was to use a stopwatch to time test runs of a few sample trains over the layout. This process

Fig. 1 Timing. Tony used a watch to time trains between towns on his HO railroad. After timing in seconds, he converted each interval to 3:1 minutes by multiplying by 3, dividing by 60, and rounding up to the nearest minute. He "padded" freight schedules, allowed extra time, for switching work and meets.

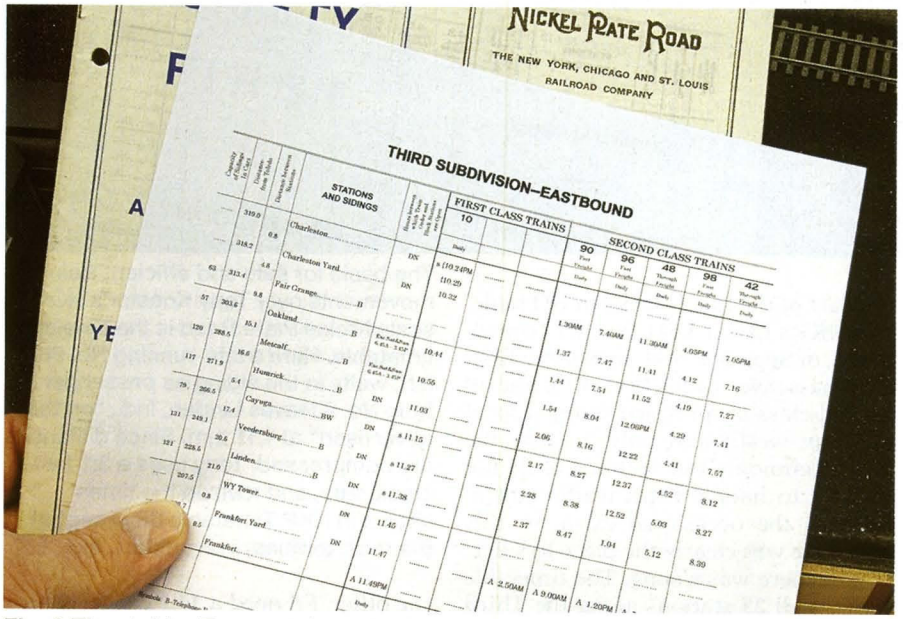

Fig. 2 Timetable. Tony put the schedules he developed into timetable format following the example of his Nickel Plate Road prototype.

shown in **fig. 1**, at the top of this page. Passenger trains would lose time owing to scheduled and flag stops. I held them at each station for 1 minute 40 seconds (5 fast-time minutes at 3:1), but they're allowed higher track speeds (ranging from 59 to 65 mph as given in timetable special instructions). Fast and through freights are allowed 49 to 55 mph. The prototype timetable shows 2 hours 24 minutes (including stops) for No. 10 between Charleston and Frankfort, 2:45 for fast freight 98, and 3:55 for through freight 42, which probably ran as fast as 98 but switched a few major interchanges along the way.

My time tests showed that it takes roughly 17 actual minutes to run between the two crew terminals on my layout nonstop. For passenger trains, I multiplied the measured times between stations by 3 and then rounded them up to the nearest whole minute. For example, 45 actual seconds multiplied by 3 is 135 fast-clock seconds, or 2 minutes 15 seconds, which I rounded up to 3 minutes. So the 17 actual minutes became about 51 fast-clock minutes – almost an hour. I then added 30 minutes to the fast-freight schedules and 60 minutes for through freights to give them time to do work and make meets.

The KC Local, No. 45, was scheduled for a five-hour run, and I used its actual times at each modeled town. I doubt the actual KC Local ever made the run that quickly, and I doubt the model will either.

Speeding up the clock ratio would lengthen the run, but my sense is that would be too fast for the timetable-and-train-order operations of the Third Sub. Besides, few freights make the run nonstop. They are delayed by meets and red home signals at crossings with other railroads, and they often need to take water at Cayuga. Busy interchanges, notably with the Milwaukee Road at Humrick, Ill., and the Chicago, Indianapolis & Louisville (Monon) at Linden, Ind., require stops by passing freights to deliver and pick up cars throughout the day. Even westbound freights work busy interchanges, as the one daily local (No. 45) can't ensure that "hot" loads such as auto parts are set out or picked up in time to make important connections.

Where to start?

The truncated distances between towns meant that only one spot on the railroad could be chosen to match the prototype's times. This was an easy choice: Frankfort (Ind.) Yard, one of two critical hubs on the NKP. Here trains from four divisions were "mixed and matched" on tight schedules.

Using a photocopy of the actual document, I made a trial version of Timetable 68 for my railroad using the actual times in or out of Frankfort and adding the measured fast-clock interval between modeled stations, plus the fudge factor for freights. We tested assumptions with this while operations on the layout settled into a routine.

One question was whether to show only towns that I actually modeled in a truncated timetable, or show all towns to be more realistic. My friend Bob Hanmer listed all the towns on his prototypes but put a gray tone over those he doesn't model. I'm showing only modeled towns, figuring crews have enough mental gymnastics to cope with as it is.

After I'd adjusted the marked-up timetable, my friend Steve King set up a master Third Subdivision employee timetable using an Excel spreadsheet. I tweaked it by substituting type fonts that looked reasonably close to the Nickel Plate's. The eastbound page of the resulting Third Sub timetable is shown in **fig. 2** above. **Figure 3** on the opposite page is an example of one of the worksheets Steve used to compare prototype with model railroad times and plot the necessary adjustments.

The other three divisions

The fast-clock version of the St. Louis Division's Third Sub timetable took care of one of the four divisions radiating from Frankfort – the one I've actually modeled. Preparing timetables for the other three divisions was even easier, since each was represented only by a short stretch of mainline track between Frankfort and a hidden staging yard. The only meaningful times are for the arrivals and departures at Frankfort.

The crew members who serve as the engineers and dispatchers for all staged trains in and out of Frankfort work with photocopies of the actual NKP timetable pages for the Toledo, Sandusky, and Peoria Divisions. These serve as general guidelines only, as many trains, especially westbounds from Buffalo and Cleveland, are late by the time they get to Frankfort.

As retired NKP engineer Don Daily frequently reminds me, "The passenger trains and some of the eastbounds were close to the published times at Frankfort, but the closest westbounds were typically an hour and a half late." As a result, eastbound trains, superior by direction, were routinely ordered to take siding for late westbound symbol freights so the westbounds wouldn't lose even more time. Even first-class No. 10 was often handled this way.

A schedule is a 12-hour window of authority to run a given train (since trains more than 12 hours late lose their schedule), and reality usually didn't match the printed times. As the timetable cover stated, "The Company has the right to vary the running of trains as circumstances may require."

Re-creating reality

And therein lies the key to timetable-and-train-order operation, not simply mimicking prototype schedules. If everything ran on time and no sections or extras were required, the dispatcher and operators could spend their working hours reading magazines. But as trains fall behind and hold up opposing traffic, the dispatcher's job is to issue helping train orders to adjust the existing schedules or create new ones in an effort to keep delays to a minimum.

At the heart of this re-enactment is the employee timetable. As I've shown here, you can adapt a prototype timetable to match your model railroad's operating objectives and provide a realistic basis for train movements. **MR**

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Timetable worksheet

Location	No. 10's actual time	Model running time with 5-min. station stops	3:1 equivalent time (rounded up to nearest minute)	Model timetable time (matched at Frankfort)
Charleston (depot)	9:25 p.m.	----	----	10:29 p.m.
Charleston yard	9:27 p.m.	45 seconds	3 minutes	10:32 p.m.
Fair Grange	9:32 p.m.	75 seconds	4 minutes	10:36 p.m.
Bushton	Not shown	(not modeled)		
Rardin	9:37 p.m.	(not modeled)		
Oakland	9:43 p.m.	160 seconds	8 minutes	10:44 p.m.
Brocton	9:49 p.m.	(not modeled)		
Melwood	9:54 p.m.	(not modeled)		
Metcalf	9:59 p.m.	220 seconds	11 minutes	10:55 p.m.
Mortimer	10:04 p.m.	(not modeled)		
Ridge Farm	10:10 p.m.	(not modeled)		
Humrick	10:16 p.m.	160 seconds	8 minutes	11:03 p.m.
Cayuga	10:25 p.m.	240 seconds	12 minutes	11:15 p.m.
Silverwood	10:30 p.m.	(not modeled)		
Cates	10:38 p.m.	(not modeled)		
Mackie	10:44 p.m.	(not modeled)		
Veedersburg	10:49 p.m.	240 seconds	12 minutes	11:27 p.m.
Mellott	11:00 p.m.	(not modeled)		
Wingate	11:05 p.m.	(not modeled)		
New Richmond	11:11 p.m.	(not modeled)		
Linden	11:15 p.m.	220 seconds	11 minutes	11:38 p.m.
Kirkpatrick	11:24 p.m.	(not modeled)		
Clarks Hill	11:30 p.m.	(not modeled)		
Jefferson	11:40 p.m.	(not modeled)		
WY Tower	11:45 p.m.	140 seconds	7 minutes	11:45 p.m.
Frankfort Yard	11:47 p.m.	40 seconds	2 minutes	11:47 p.m.
Frankfort	11:49 p.m.	40 seconds	2 minutes	11:49 p.m.

Fig. 3 Adjustments. After a marked-up NKP timetable was tested over several operating sessions, Steve King created new timetable pages in an Excel spreadsheet. This worksheet shows the relationship between the actual times in NKP Timetable 68 and the running times on Tony's HO railroad.

Six steps to a prototype-based timetable

Step 1: Obtain a prototype employee timetable for the division of the railroad you model or use as a basis for freelancing. They're sold at railroadiana meets or can be obtained through railroad historical societies.

Step 2: Use a watch with a second hand or a stopwatch to time runs (in seconds) between towns on your layout. Convert these intervals to match the fast-clock ratio you plan to use, keeping in mind that it takes time to issue and check train orders.

Step 3: Pick an anchor point such as a major freight or passenger terminal where the prototype timetable's arrival and departure times will be retained.

Step 4: Adjust the published times at all other stations to match the reduced running times on your model railroad. Pad the freight schedules a bit, as the trains may have work to do en route, and it's likely they'll be running somewhat late anyway. (A train's schedule remains in effect for 12 hours at each station where time is listed; if it's more than 12 hours late at any point, it "dies" – loses its schedule – and can move only on train orders.)

Step 5: Use marked-up copies of the prototype timetable for several operating sessions to ensure that all bugs such as overly optimistic schedules have been identified and resolved.

Step 6: Use spreadsheet software to create an authentic-looking timetable schedule, and don't forget the special instructions section that supplements the book of rules. – *T.K.*