FLAGS AND SIGNS

Add interest to your op sessions by simulating prototype maintenance indications ...

- Roy Buchanan Photos by the author

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ailways use flags to designate particular types of trains, and for maintenance-of-way safety. Most modelers are aware of the white flags flown on the front of engines

to designate extras, and the green flags flown on engines to designate a second section following. However, there are five main

Lead photo. Simulated rail-mounted blue flag on the team track.

types of maintenance-of-way safety flags that are used wherever necessary on a railway.

The explanations are general only, and do not cover all circumstances. These are the rules that we, as modelers, can easily incorporate into our modeling and operations. I've deliberately left out the distances in most of the rules that the flags must be placed before a hazard, as most modelers would not be able to replicate the scale two-mile distance required. I have made reference to the current Canadian Rail Operating Rules (CROR) which for all intents and purposes are the same as the General Code of Operating Rules (GCOR) used in the United States. The Uniform Code of Operating Rules (UCOR) preceded the CROR and GCOR and were usually modified to represent



2. Simulated tie-mounted blue flag on team track.





rules for specific railways. As an example, the UCOR were modified in 1940, 1951, and 1962. PDF links to some rule sites are listed at the end of the article. Rules in other countries will vary, and modelers outside North America are urged to consult local operating rules. The diagrams referred to throughout the article come from the CROR, and are used with the kind permission of the Railway Association of Canada. I must also note at this time that rules 840.1 and 843 are going to change sometime in the near future according to the Railway Association of Canada.

Regardless of the era you model, flags are made of cloth or metal, and can be different sizes. The type of cloth used in the various eras is irrelevant, as we will be using modeling materials to simulate the flags. The size of the flags depends upon the railway, or railway contractors, rules and whether or not the flags are made in-house, or are purchased from an equipment supplier. Blue flags, for instance, must be a minimum of 18" x 12" according to the American Railway Engineering and Maintenance of Way Association, but can be larger. Modelers who want to be true to a specific prototype, or era will have to research their favorite railway and the operating rules in force during their era to determine the size and how the various flags are, or were mounted.

The red, yellow, yellow-over-red, and green flags I measured at Southern Railway of Vancouver Island varied in size, even though it appeared that they were made by the same company or person. Overall measurement of the yellow-over-red flag was 24" x 27" while the red, yellow and green flags measured 22" x 29". Metal flags are mounted on a metal pole which can be anchored to the rail by various types of mechanisms that support the flag staff, modern magnetic supports that sit on top of the rail, anchored to a tie, or can be driven into the ballast on the side of the track. The height of the staff varies





3a-3b. Prototype rail-mounted blue flag.





between suppliers and railways, but they must be high enough so approaching trains can easily see them. See Rule 846, CROR in the sidebar. Cloth flags with a metal stake on each side of the flag are used along the side of the track to indicate slow orders, stop orders and resume normal speed.

Some blue metal signs have lettering on them to tell staff what type of work is being done on the equipment. As an example a blue sign might say, "STOP CREW AT WORK." Metal signs are usually blue, but might also be red, yellow, or green and must be painted on both sides. For those modeling the modern era, these signs must be reflective. In some cases a white reflective border is used on blue signs. The era being modeled will determine whether or not trackside flags are metal or cloth. For maintenance crew convenience almost all modern trackside signs are cloth.



4. Rail clamp detail.

Blue flags are one of the most common flags used on a railway, and are used universally to designate maintenance personnel working on rolling stock or equipment. Rule 26 in the CROR defines how blue flags are to be used. These flags are used mostly in yards, around engine houses and sidings, and are placed on the track where the damaged/broken piece of rolling stock is situated. They can be coupler-mounted, rail-mounted, or tie-mounted, are usually made of metal, and must be at least 18" x 12".

The maintenance foreman in charge of the work will place the flag on the track before work is started on the designated piece of equipment. Only the person who placed this flag, or another employee of the same grade may remove the flag. Blue flags placed on a rail can be clamped to the rail with various types of clamps, depending upon who manufactured the clamp. Blue flags that are secured to a tie would have a simple spring-loaded plunger type locking/unlocking mechanism that allows them to be lowered and lie flat on the ties when the flag is no longer required. Some railways also allow the use of coupler-mounted blue flags. These are usually used in the area of equipment maintenance facilities. If the track is double-ended then a blue flag must be placed on both sides of the car, or row of cars, in a clearly visible location that will allow approaching engines sufficient time to stop. If the flag is to remain in place during the hours of darkness, a blue light will be mounted to the flag. Blue flags are the easiest flag to incorporate into our model railroads [1, 2, 3 and 4].

Red flags are used to indicate a Stop Order. Except under the circumstances outlined in Rules 840.1, 840.2, and 840.3, they are always preceded by a yellow-over-red flag. Maybe a track crew is clearing a downed tree, fallen rocks, replacing a rail, or





performing some other type of track maintenance. The track foreman would place the flag as directed by the operating rules before the work is started, and remove the flag when it is safe for a train to proceed. The location of the red flag will always be published in the General Bulletin Orders (GBO) and the Daily Operation Bulletin (DOB) [5a-5b].

If the flag is to remain in place during the hours of darkness, a red light must be mounted to the flag. If the red maintenance flags are designed to be secured between the rails they could very well be metal with a central mounting stake. Red flags mounted on the right side of the track will most likely be cloth and be mounted with two metal stakes. See Rules 840.1, 840.2, 842 in the sidebar. Red flags used judiciously during an operating session could easily make the session more interesting [12].

Yellow flags indicate a Slow Order and require a train to proceed at the designated speed in the operating rules, often only five or 10 MPH. Maybe a rail has cracked, or a maintenance crew is working on an adjacent track, repairing a turnout, or performing other maintenance on the line. Yellow flags can also be used to indicate slow orders in areas where unforeseen hazards like falling rocks may occur. As with the blue and red flags, if the flag remains in place during the hours of darkness, then a yellow light must be mounted to the flag.

Yellow flags are placed on the right side of the track and may be metal with a single stake, or cloth with two stakes, depending upon the railway. Yellow flags would always be followed by a green flag at the end of the Slow Order area. Slow orders will also be published in the GBO and in DOB. See Rules 840.1, 843, 845 in the sidebar. Yellow flags can be very easily incorporated into our model railroads for operating interest [6 and 13].





5a-5b. Prototype yellow-over-red flags.





A combination of the yellow flag over the red flag indicates to the train crew that a slow order is in effect and that a stop will be required. These flags are one piece and are generally the same size as other flags used on the railway. Yellow-over-red flags are always placed on the right side of the track. As with the red and yellow flags, yellow-over-red flags must be published in GBO and in DOB [6 and 14]. See rule 842 in the sidebar.

Green flags indicate that a train may resume normal operating speed for the track that is being used and are always placed on the right side of the track. (Note: Some railways used a white flag in earlier eras to designate that a train could resume normal operating speed.) See Rules 843 and 845 in the sidebar [13].

Rather than waste my brass wire (I live in a hobby shop-void area) I use the excess wire I clip off LEDs and resistors to make my flags. The resistor wire is a little stronger and round, whereas the LED wire is somewhat weaker and square. The difference in wire profile is really not noticeable in HO scale once the flags are placed on the layout. I've used colored 24-pound paper for my flags that would be rail-mounted and styrene for signs that would be mounted on a central stake to a tie, and for the trackside signs. One strip of paper, or styrene, makes lots of flags which you can then share with your modeling friends [7].

To make blue or red paper flags, start by carefully cutting a scale 12 inch strip off a sheet of blue paper. (Note – I used yellow paper in the photos so the paper would show up against the blue cutting mat.) Tape this strip to your cutting mat and carefully align your scale rule or use an inch scale along the strip of paper. Mark off every 36" with a sharp pencil. This is the line you use as a guide when gluing your wires to the paper strip [8].





6a-6b. Prototype yellow flags.





Don't trim the wires to length, as their height above the grade will be determined by the depth of the hole you drill to hold the wire. To hold the wires onto the paper a miniscule amount of CA glue is all that is needed. Make sure the ACC glue doesn't



7. LED, resistor and trimmed wires.



8. Resistor and LED leads glued to paper every 36 inches.

extend beyond the paper's edge or you'll end up with a flag that was run over by a locomotive. Once the CA has dried, cut the paper with a sharp razor blade, or X-Acto knife, 18" either side of the wire [9].



9. Cutting paper every 36 inches.



10. Fold over and glue the flags.





Fold the paper over the wire so that the open ends meet. The shortening of the flag by the fold around the wire isn't noticeable on the finished scale flag, but if you do want your flags to be exact, just add one or two scale inches to your scale measurements above. Glue the paper together with a tiny dab of white glue, and paint your wire black, gray, or a rust color [10]. You now have a flag ready to be used on your layout.

To simulate a rail-mounted flag, bend the flag staff like the blue flags in [11] and then drill a hole of the appropriate size between the rails close to either rail. For a flag mounted to a tie between the rails drill a hole centered on a tie or use the rail spike hole that is pre-drilled on flextrack.



11. Modeled flag assortment, left to right, top to bottom. Blue tie-mount metal flag and blue rail-mount metal flag. Red cloth flags, red tie-mount/right side ballastmount metal flag, alternate red tie-mount/ right side ballast-mount metal flag. Yellow cloth flags and right side ballast-mount metal flag. yellow-over-red cloth flags. Green cloth flags and right side ballast-mount metal flag.



12. Model stop order, red flag.

For blue styrene signs to simulate metal, I changed the measurement to 15" x 18'" using .010" styrene. For red, yellow, yellow-over-red and green styrene flags, I like the proportions of HO flags that are 18" x 24", so this is what I used. Red, yellow and green styrene flags can be supported by one stake to simulate a metal sign, or by two stakes for cloth signs mounted on the right side of the track. Yellow-over-red flags are always mounted on the right side of the track, and would most likely be made of cloth. Single-stake yellow and green metal flags may also be used by some railways [11].

As model railroaders, we likely won't be able to place the flags the specified distance from a hazard, but we can place them far enough away from a hazard to allow our trains to come to a slow stop, or proceed at a slower speed. Whether you make paper or styrene flags, are serious about operations, or you just





want some additional detail interest on your layout, flags are one more way we can achieve these goals [12, 13 and 14].



13. Model slow order, yellow flag and opposite direction resume speed green flag.



14. Model yellow-over-red flag. Article continued on the next page ...



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Extracts from the Canadian Rail Operating Rules CROR

840.1 PROTECTION OF TRACK WORK ON NON-MAIN TRACK – RULE 40.1

Note: Before starting any track work on a siding, the RTC must be advised. Before starting any track work on a yard track, the employee (if any) responsible for the yard tracks, must be advised.



Before any track work is started, the foreman will provide protection as follows:

(i) each switch must be locked with a special lock in the position which will prevent a movement from operating on the portion of track where work is to be performed; or

(ii) place a red flag by day, and in addition, a red light by night, or when day signals cannot be plainly seen, between the rails in each direction from the working point. When practicable such signals must be placed at least 100 yards from the working point and where there will be a clear view of them from an approaching movement of 300 yards if possible. Where there is equipment on the track which prevents a clear view from an approaching movement of 300 yards the red signals must be placed to include such equipment.

Protection may be provided by using a combination of the requirements of items (i) and (ii).

(iii) Before starting any track work at any location where the work will be protected by the use of the prescribed red signals, foreman must ensure the signals will be visible to all movements operating or switching within the limits.

840.1 PROTECTION OF TRACK WORK ON NON-MAIN TRACK – RULE 40.1



(i) The working limits must be protected by a red flag by day, and in addition, a red light by night, which must be placed between the rails, at least 100 yards where practicable, in each direction from the working point. The limits must be protected by lining and locking one or more main track switches to prevent access to the working limits. Such switches must be locked with special locks;

(ii) When not practicable to line and lock switches to prevent access to the working limits, TOP or Rule 842 protection must be obtained to restrict movements from entering the cautionary limits;

(iii) Switches within the working limits that provide access must be lined for normal position and locked with a special lock.

(b) After track work is completed, main track switches lined to protect the track work must be restored to normal position. The RTC and/or the employee responsible for the track must be so advised.



Unless otherwise specified in special instructions,

(a) Before any track work is started, the RTC and/or the employee responsible for the track must be advised, and in addition:





40.3 PROTECTION OF TRACK WORK AT AUTOMATIC INTERLOCKING - RULE 40.3



When the foreman is in possession of other protection encompassing all routes within the interlocking limits, protection as per Rule 840.3 is not required. Track work may be performed within the limits of an automatic interlocked railway crossing at grade after protection has been provided as follows:

(a) Permission must be obtained from the RTC of both railways (where applicable).

(b) After permission has been obtained and before any track work is started, the foreman must open the box marked "switches", open the knife switch and must wait five minutes or such greater time as may be posted in the box. The switch must be left open until track work is completed.

(c) In addition, a visible indicator marked "40.3 Protection" or special lock must be secured to the box marked "switches" to indicate that track work is ongoing.

(d) After track work is completed the RTC of both railways (where applicable) must be notified.

842. PLANNED PROTECTION – RULE 42

(a) When protection is required, the request must be in writing and on the prescribed form. When protection has been provided, the track and time limits must be confirmed in writing prior to the foreman named in the GBO arranging for the display of the prescribed flags as follows;



(b) When a specific track is to be used, instructions from the foreman must specify the track upon which the instructions apply.

In CTC, when Rule 842 protection is in effect on more than one track or when signalled turnouts are within the limits there must be a clear understanding in writing between the foreman and the RTC as to what route(s) movements are to use. The foreman's instructions to the movement must be identical to the routing arrangement with the RTC. Should the foreman require operation on a specific track when the arrangement with the RTC was for more

(i) place a red flag at each location stated in the GBO to the right of the track as seen from an approaching movement; and

(ii) place a yellow-over-red flag at least two miles outside the track limits defined by the red flags, to the right of the track as seen from an approaching movement.

(iii) Track work must not be undertaken until the prescribed signals are in place in all directions.

(iv) Rule 842 flags must not be in place more than 30 minutes prior to or after the times stated in the GBO unless provided for in the GBO.

(v) Rule 842 limits must not be overlapped.





than one route, the foreman must make a new arrangement with the RTC before authorizing the movement.

(c) Track limits shall be kept as short as practicable and be expressed in whole miles or by other identifiable locations.

(d) The GBO must indicate the location of flags that cannot be placed at the distance prescribed by Rule 842.

843. SLOW TRACK PROTECTION – RULE 43



(a) When slow track protection is required the request must be in writing and when practicable on the prescribed form, and after GBO protection has been provided, the speed restriction and limits must be confirmed to the foreman in writing who will arrange to:

(i) place a yellow flag at least two miles in each direction from the defect, to the right of the track as seen from an approaching movement; and

(ii) place a green flag in each direction, immediately beyond the defect, to the right of the track as seen from an approaching movement.

(b) The GBO must indicate the location of flags that cannot be placed at the distance prescribed by Rule 843.

(c) When the placement of flags as prescribed by Rule 843 is delayed, the RTC must be advised and the following must be added to the Form V: "Signals may not be in place." The flags must be placed as soon as possible and the GBO changed accordingly.

(d) When a Rule 43 restriction is located at a single mile point, one green signal will be displayed to identify the restriction and may be displayed to either side of the track.

(e) When a rail break has been detected by an engineering employee and it is safe to operate over the break at a speed less than posted speed, the RTC will provide GBO protection to affected movements stating the authorized speed over the break and how such location is marked in the field, by either a Rail Break Sign or foreman, at the break. Flags required by Rule 843 will not be in place.

(f) The regular placement of flags as required by Rule 843 must be utilized after twenty four (24) hours if the defect is continuing.

845. SIGNAL PLACEMENT MULTI-TRACK



Except on a subdivision designated in special instructions, signals required by Rules 842 and 843, must be placed to the outside of the outermost track(s) and not between the main tracks.





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846. MOUNTING OF SIGNALS

(a) Signals displayed for protection of impassable or slow track must provide an unobstructed view of them as seen by the crew of an approaching movement.

They will be of the prescribed color, size and shape.

(b) When a day signal cannot be plainly seen, each flag must be reflectorized or equipped with a reflectorized lens, target or disc, or a reflectorized sign may be used instead. In the application of Rules 840.1 and 840.2, the required light must be displayed.

(c) Red, yellow, and yellow-over-red flags may display those colors only in the direction of an affected approaching movement. Green flags must display that colour in both directions.



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- Colored 24 lb. paper
- .010" styrene
- LED and resistor wire trimmings, or brass wire
- Wire cutters
- Pencil
- Scale rule or cutting mat with inch scale
- X-Acto knife or razor blade
- Masking tape
- CA glue
- White glue
- Acrylic paints

Links

Canadian Rail Operating Rules https://www.tc.gc.ca/eng/railsafety/rules-tco167.htm

General Code of Operating Rules watcocompanies.com/safety/pdfs/GCOR%202010.pdf

Burlington Northern Santa Fe bnsf.com/employees/safety/pdf/MWSafety2004.pdf

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Roy returned to the hobby after a 20+ year hiatus in 2009. A fan of the Canadian Pacific maroon and gray, Roy models the '50s and '60s on his two level 7 x 10-foot Ghost River Railway, a fictional logging and mining subsidiary of the CP. Geared locomotives dominate the logging branch with first- and second-generation diesels seen on the branch main. Living in a hobby shop void,

Roy enjoys kitbashing, scratchbuilding and problem solving. He is a returning contributor to MRH, with his first contribution the Rock Molds using Kitchen Caulk article in the MRH issue 10 – Nov/Dec 2010 issue. Roy and Anne live in Port Alberni on Vancouver Island.



