Operating Guidelines

Revised and Adopted January, 2007

Frequency and Time of Operating Sessions: Sessions will be held from 7:00 – 9:30 PM on the last Tuesday of each month, the week immediately preceding the First Tuesday Open House. Those who can arrive before 7:00 are encouraged to do so, as various jobs may or may not be available for those arriving later than 7:00. The Supervisor will make a good-faith effort to find a job for late-comers, however, when possible.

Objectives for Operating Sessions

1. Club members shall operate a model railroad as reasonably close to prototypical situations as possible while still having fun.
2. Operating sessions will teach club members and visitors something about prototype operations.
3. Operating sessions will foster teamwork and collaborative skills among club members.
4. Operating sessions will familiarize club members with the technical operations and skills necessary to effectively operate the Mountain Pacific layout of the Flagstaff Model Railroad Club.

Geography of the MPL Territory

The Mountain Pacific Lines is conceptualized as a north-south “bridge line” that connects Phoenix, Arizona with Provo, Utah, with trackage rights further north to Ogden. For purposes of realistic operations, it is helpful to keep the regional geography in mind, and will be done so for this year’s sessions. True distances between major cities and towns can be considered, along with dominant physical features such as the Basin and Range province, the Mogollon Rim, and the Colorado Plateau. Though distances are necessarily compressed on the layout, it is still possible to take geography into account.

The schematic north-south map below (page 3) shows the dominant places modeled between Phoenix and Ogden that are relevant for operations. This geographical context has influenced the various jobs (or “tricks”) designed for our operating sessions, hopefully adding yet another layer of realism to our train movements. As you get to know the MPL, it will be helpful for you and your crew to be familiar with this basic geographical overview. Also, it should come as no surprise that train crews out of Phoenix find themselves in desert-type scenery, replaced further north by mountains and trees at higher elevations.

First, the distance between Phoenix and Ogden is, in real life, about 700 miles (736 driving miles, according to MapQuest), and 140 miles between Phoenix and Flagstaff. Flagstaff is therefore not the “half-way” point on the MPL, but is roughly the “quarter point”. Instead, Hill Valley is interpreted here as almost the half-way point, for purposes of meets. As a division-point yard, therefore, Flagstaff will operate differently with “nearby” Phoenix than it does with far-off Ogden. This provides some fun opportunities for operating sessions, which we will adopt for 2007:

- Only “half” of the MPL is actually modeled. We can’t “see” the route's northern half, using the geographical context described here. Through freights and express passengers on the MPL can be managed more easily by arranging hypothetical “meets” off the layout, (hence, at Ogden staging). One train covers the layout northbound, past Hill Valley, “disappears” at staging, to be
replaced by another southbound that emerges onto the layout from staging. The “meet” has essentially occurred north of the modeled layout, thereby only tying up the HO main line with one through train at a time rather than two (if so desired). Occasionally, meets might occur at Hill Valley or Flagstaff for various reasons.

- **Options to simulate longer distance** between Flagstaff and Ogden: If operators wish to simulate the longer distance between Flagstaff and Ogden, a northbound train can pass Hill Valley, take the bypass, and run the entire layout again pretending to be on the northern portion of the line. This may provide some opportunities for more advanced sessions.

- **Local freights** can originate from Flagstaff but with different expectations. The way freight north can only make it one way each day, returning to Flag the following day (as commonly occurred on various prototypes). The way freight south, however, can usually manage a round trip from Flagstaff to Phoenix and back, thereby returning the crew home on the same day.

- **Local passenger trains**, namely the Escalante and the Mogollon, originate and return to Flagstaff, serving only the major towns nearby. Far-off cities are served by express, long-distance trains. The Escalante travels north to Hill Valley, Utah, and returns to Flag. The Mogollon heads south from Flagstaff and turns at Timber Creek, a town just above the Mogollon Rim on the edge of the Colorado Plateau.

- **The steepest grade on the line** is over Chafee Canyon (recently populated with a diverse array of swimmers and campers), and represents the climb up the daunting Mogollon Rim, the most challenging engineering project during the building of the MPL (we can imagine). Thus, trains move somewhat prototypically from Phoenix staging through the desert Basin and Range Province, climb the southern edge of the Colorado Plateau known as the Mogollon Rim, and arrive shortly at Timber Creek. For steam operations, this may present opportunities for a helper district (as was envisioned by past club members) between Phoenix and Timber Creek.

(Please see schematic map of the MPL, next page.)
Personnel: Descriptions and Responsibilities

**DISPATCHER**
- Maintains final authorization over the movement of freight and passenger trains, from Phoenix to Ogden. All operators must obtain permission from the dispatcher prior to movement of railroad equipment anywhere along, or involving, the main line.
- Provides verbal clearance to scheduled and extra trains.
- Keeps track of operating schedule for departing trains.
- Responsible for operating mainline turnout toggles on the dispatcher's booth control board.
- Communicates with Flag Yard Master regarding train movements into and out of yard limits.
- Works professionally with crews in resolving accidents and other unforeseen issues.

**YARD MASTER / HOSTLER (Flag Yard, PHX/OGD)**
- Responsible for decisions regarding the movement of railroad equipment within yard.
- Responsible for determining motive power for jobs.
- Train crews operate their own train within yard limits, but only with the permission of the Yard Master.
- Responsible for controlling all local turnouts and blocks within yard.
- May not utilize the main line without the dispatcher's approval.
- Responsible for transferring all engine and car cards with waybills to designated locations, keeping all car cards with their respective rolling stock.

**ENGINEER**
- Responsible for the safe operation of his/her assigned locomotive.
- Remains either in dispatch booth or on the floor, depending on situation and communication needs.
- Responsible for communicating with Brakeman, Dispatcher, and Yardmasters.
- Maintains no authority over decisions regarding train movement.
- Responsible for staying within speed limits, for the careful handling of rolling stock, and for the safe operation of the train.
- In the case of no assigned conductor, engineer takes on the brakeman’s responsibilities.

**CONDUCTOR**
- In charge of assigned main-line train.
- Responsible for all movements and safe handling of the train.
- Maintains authority over the engineer.
- Coordinates safe train movement with engineer, dispatcher, and yard masters.
- Responsible for transferring all engine and car cards with waybills to designated locations, keeping all car cards with their respective rolling stock.

**SUPERVISOR**
- Supervisor is appointed by the Board of Directors on an as-needed basis, but typically for an annual cycle between annual meetings.
- Supervisor has authority to serve as a mentor, delegating position to another volunteer to gain experience with operating sessions. Delegation of position to someone else must take place at least one week in advance of the operating session.
- Responsible for setting up and organizing the operating session in advance, unless job is delegated to someone else, as stated above.
- Assigns job positions for each operating session in an efficient and flexible manner, taking the interests of participants into consideration when possible.
- Sets speed restrictions and other special situations and rules, communicates with all personnel as necessary.
• If not enough personnel are available to fill necessary jobs, the Supervisor can assume the most important position that is required for the successful operation of the railroad. Or, Supervisor can cancel jobs as necessary.

Definitions of Train Movements

The following common train movements will be used in various combinations for any given operating session. Certain train movements may not be used during a particular session.

• **Switcher**: Loco and crew assigned to a specific railroad yard or town with numerous switching duties. Typically used to classify cars at division-point yards or to spot set-outs and pick-ups at busy towns along the line.

• **Way Freight**: A local freight train switches and spots cars at towns and spurs along the line. Takes care of set-outs and pick-ups to minimize delays for through freights. Typically operates between two division-point yards, either one way or return trip each day, depending on distance and volume of switching duties.

• **Turn**: Freight train assigned to a specific high-volume interchange, industry, or town along the line. Originates at a division-point yard, conducts switching duties at specific town or interchange, returns to same division-point yard.

• **Through Freight**: Handles freight traffic between division-point yards. Train is blocked with “proppers” for the next division-point yard and “throughs” for points beyond that yard along the line. Typically picks up and drops off cars at division-point yards and important interchanges only, allowing train to move quickly along the line.

• **Fast Freight**: A pre-blocked priority train with only one or a few blocks of cars to minimize switching on long-distance hauls. Rarely switches at division-point yards to save time and costs. Typical for intermodal or perishable merchandise.

• **Express Passenger**: Longer-distance, scheduled passenger train (usually with special names or numbers) that stops only at major stations to minimize delays.

• **Local Passenger**: typically a shorter-run passenger train that stops at all stations and occasional flag stops.

• **Mixed**: A Way Freight or Turn might occasionally add one or two passenger cars to shuttle small numbers of passengers along the line, serves local stations and occasional flag stops.

• **Extra**: Additional, as-needed freight or passenger train not regularly scheduled. Could travel as second section behind another train to avoid traffic tie-ups. Or, engine or cars could be “deadheaded” – incorporated into a scheduled train and cut off for work at a particular location. When work is completed, the cut-off train becomes an “Extra” as it returns to the originating station.

Typical Train Movements on the MPL

These are typical train-movement jobs along the MPL on a given (prototype) day. Each operating session will include various combinations of these jobs, given the duration, complexity, and number of crew members available. Further, additional variations on these jobs may occur occasionally, to add interest and diversity to particular sessions.

• North Flag Switcher (Assigned to Flag Yard, north end)
  o ATSF Interchange traffic
  o Classifies cars for trains to and from the north.

• South Flag Switcher (Assigned to Flag Yard, south end)
  o Ice House service
  o Engine Terminal/RIP Service
• Classifies cars for trains to and from the south.
  • Oildale Turn
    o Originates and returns to Flag; serves East Flag, Oildale.
  • Glenview Mixed
    o Originates and returns to Flag, serves Glenview via Timber Creek.
  • Way Freight South
    o Serves industries between Flag and PHX. Returns to Flag the same day.
  • Way Freight North
    o Serves industries between Flag and OGD. One way each day. Distance too long for return trip.
  • Phoenix to Ogden Through Freight (Symbol: PO-1,3,5, or 7)
    o Drop and pickup at Flag Yard (Fast Freight version omits switching)
    o Maintains priority above all other freights.
  • Ogden to Phoenix Through Freight (Symbol: OP-2,4,6, or 8)
    o Drop and pickup at Flag Yard (Fast Freight version omits switching)
    o Maintains priority above all other freights.
  • Extras
    o Additional freight or passenger trains, as needed, unscheduled.
    o Usually originates from Flag with various possible destinations, though could also originate elsewhere.
  • Express Passenger Trains
    o The Southwest Limited: PHX – OGD – PHX. Sleepers, Diner, Coaches
    o The Peaks Express: OGD – PHX – OGD. Coach only, Café car
  • Local Passenger Trains
    o The Mogollon: Flag – Timber Creek – Flag. (1-3 cars, all stops).
    o The Escalante: Flag – Hill Valley – Flag. (2-4 cars, all stops).

Participant Guidelines and Expectations

1. **General Operating Rules for Train Movement:** Session Participants are expected to make a good-faith effort to follow the following railroad protocols:
   - No motive power with train shall leave any yard limit without a caboose or a designated rear marker.
   - All steam trains must stop for water at all water tanks on the mainline.
   - All local passenger trains must stop at all passenger stations for at least 10 real-time seconds.
   - All through passenger and freight trains must stop at Flagstaff for a crew change.
   - All main-line train crews must receive permission from the dispatcher to occupy certain blocks of the railroad for certain amounts of time. If necessary, train must stop until permission has been granted.
   - When spotting cars and conducting switching moves, operators are expected to use realistic train speeds and practices:
     - stopping before and after coupling ("ramming speeds" not allowed);
     - safe and slow speeds to assure minimum jostling of merchandise or passengers;
     - gradual acceleration and deceleration;
     - stopping at unprotected grade crossings before progressing.
   - Trains may not block grade crossings for more than 10 scale minutes, and switching moves should avoid blocking grade crossings with standing cars whenever possible.
   - Passenger trains should occupy the track closest to depots, while freight trains should occupy the furthest track. Passenger trains on the far track are not allowed to make station stops until freight trains in the block have cleared the station.
2. **Speed Limits:** The maximum speed limits on the MPL are as follows:
   - Passenger trains: 60 mph
   - Freight trains: 50 mph
   - Within yards: 20 mph

3. **Train Lengths:** Prototype railroads have their own limitations on train lengths. If there are more cars blocked for a given destination than are allowed on a train, a second train will be dispatched to handle the extra traffic. For the MPL, main-line trains should not exceed the following lengths during operating sessions:
   - Through Freights: 20 cars
   - Way Freights, Turns: 15 cars
   - Express Passengers: 8 cars (plus any head-end business)
   - Local Passengers: 4 cars (plus any head-end business)

3. **Bad-order Rolling Stock:** Any piece of rolling stock that derails three times during the operating session will be “bad-ordered” and switched out to the nearest reasonable siding or station until after the session, whenever possible. A bad-order waybill will be added to the card, listed with the described problem. If all else fails, any person desiring to remove faulty equipment from the layout must secure permission from either the supervisor or the dispatcher.

4. **Removing Equipment from Layout:** The PHX-OGD staging “fiddle” yard at the north end of the facility (including the ATSF interchange track) is the only location on the HO-scale layout where rolling stock may be removed or added by hand. Any other equipment throughout the remainder of the layout must be moved with appropriate motive power, except in special circumstances (e.g. derailment) when permission is secured from the dispatcher or supervisor.

5. **Personal equipment:** All personnel who wish to include their own personal equipment into an upcoming operating session must inform the Operation Supervisor at least one week prior to the session and supply a completed car card for each piece of rolling stock. All personal equipment must be available to the Supervisor at the club layout site at least one week in advance. It is understood that any personal equipment used in an operating session is trusted to the Supervisor so that the operating session can be set up. If private locos or cars are in the way without the owner present, the supervisor may remove them to the back shelves of the club facility or to the underground storage tracks. Members should plan to keep their rolling stock on the layout for several months, if possible, once available for operating sessions. Frequently adding and removing personal rolling stock for operating sessions is discouraged, to expedite the monthly set-up process for sessions and to minimize confusion.

6. **Job Assignments:** Job assignments for operating personnel and train movements are first-come, first serve, and can only be assigned to club members who are physically present at the time of the session. Supervisor and participants are encouraged to try different jobs over time for diversity and to allow other club members to learn new positions.

7. **Use of Club Facility During Sessions:** No construction, project work, or general repair of any kind to the layout or facility may be conducted during an operating session, unless it is vital to the operation of the railroad for that particular operating session.

8. **Club Member Participation in Sessions:** Club members who attend a club meeting during the night of an operating session are not required to participate in the session. Participation is always voluntary. Non-participants, however, are expected to not interfere in any way with the session.

9. **Proficiency of Session Participants:** Any person assigned to a particular job position should feel reasonably comfortable and competent with that particular job in advance of the operating session. Novices are encouraged to try new jobs, typically with a mentor. Patience is requested of all
participants for their colleagues, regardless of experience level. This is likely a learning experience for everyone in some way, and newcomers should be encouraged rather than intimidated.

10. **Participant Conduct:** The conduct of club members should be of a professional manner as specified in Section 4.8 of the Club Bylaws. Anyone who is not behaving professionally will be asked to relinquish their duties during the session by the acting Supervisor.

11. **Operations during times other than official sessions:** Club members are allowed to conduct “private” operating sessions at times other than the official monthly sessions. Those who do so are responsible for maintaining the same car card and waybill system used during official sessions. Cards must remain with their respective rolling stock, and waybills should be rotated as necessary.

12. **Standards for Rolling Stock:** All rolling stock in an operating session must meet national NMRA standards with regard to weight, coupler height, and trucks. All rolling stock will be equipped with Kadee-type knuckle couplers that maintain the proper height as determined by a Kadee Gauge. Any equipment problems may be cause for the removal of the rolling stock from the operating session. All wheels should be metal rather than plastic whenever possible.

13. **Communication Among Participants:** Session operators are expected to use the minimum voice volume necessary when voicing questions or orders between participants. Radios should be used, when available, to communicate with the dispatcher. Standard railroad hand signals should be used between brakemen and engineers (see below), and standard whistle and bell signals should be used when sound is available (see below).

14. **Use of Sound:** The choice to use of sound in locomotives so equipped is at the crew’s discretion. However, due to the confined space of the facility, volumes should be kept to a minimum, as should the number of locomotives using sound at any one time. The Supervisor may request a decrease in sound volume or occasional muting to keep sound distractions to a minimum during a session. As the use of sound becomes more common, the Supervisor may assign specific jobs for sound prior to the session.
   a. **Priorities for sound:** Trains with more switching moves enjoy highest priority for sound, especially way freights, turns, switchers, and local passenger trains.
   b. **When sound is used:** Crews with sound-equipped locomotives are expected to make a good-faith effort to use loco sounds in prototypical ways, especially with respect to whistle signals and bell. More advanced operators may choose to adopt other sounds as desired by the crew.
   c. **Volume of Sound:** Crews are expected to maintain a sound level quiet enough so that locomotive is not or barely heard beyond a five-foot radius of the locomotive.

**Hand Signals**

To add realism and to minimize noise from talking, authentic railroad hand signals should be used when possible, especially between brakemen and engineers. When radios are used, hand signals also minimize the amount of voice traffic over the radio system. The signals below are more or less standard, and are used to signal the head end (engineer or fireman in the locomotive) from the caboose or other part of the train. They are frequently used when cutting cars in or out of a train and are usually given by a brakeman or conductor.

The hand or flag moved the same as the lamp, as illustrated in the following diagrams, gives the same indication, except in the observance of rule 12a the hand or flag movement may be above the shoulder.
• 12a: STOP - swung across the track.
• 12b: REDUCE SPEED - held horizontally at arm's length.
• 12c: PROCEED - raised and lowered vertically.
• 12d: BACK - swung vertically in a circle at half arm's length across the track.
• 12f: APPLY AIR BRAKES - swung horizontally above head, when standing.
• 12g: RELEASE AIR BRAKES - held vertically at arm's length when standing.
• 12h: any object waved violently by any one on or near the track is a signal to stop.

# Whistle and Bell Signals

When sound is available, a crew should communicate through a combination of whistle and hand signals, as provided below.

The required whistle signals are illustrated by "o" for short sounds and "-" for longer sounds:

<table>
<thead>
<tr>
<th>Sound</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Succession of short sounds</td>
<td>Use when an emergency exists, or persons or livestock are on the track. When crews on other trains hear this signal, they must stop until it is safe to proceed.</td>
</tr>
<tr>
<td>(2) -</td>
<td>When stopped: air brakes are applied, pressure equalized.</td>
</tr>
<tr>
<td>(3) - -</td>
<td>Release brakes. Proceed.</td>
</tr>
<tr>
<td>(4) o o</td>
<td>Acknowledgment of any signal not otherwise provided for.</td>
</tr>
<tr>
<td>(5) o o o</td>
<td>When stopped: back up. Acknowledgment of hand signal to back up.</td>
</tr>
<tr>
<td>(6) o o o o</td>
<td>Request for signal to be given or repeated or not understood.</td>
</tr>
<tr>
<td>(7) - o o o</td>
<td>Flagman protect rear of train.</td>
</tr>
<tr>
<td>(8) o o o -</td>
<td>Flagman protect front of train.</td>
</tr>
<tr>
<td>(9) - - - -</td>
<td>Flagman may return from west or south.</td>
</tr>
<tr>
<td>(10) - - - -</td>
<td>Flagman may return from east or north.</td>
</tr>
<tr>
<td>(11) - - o -</td>
<td>Approaching public crossings at grade with engine in front, start signal not less than 1/4 mile before reaching crossing, if distance permits. If distance does not permit, start signal soon enough before the crossing to provide warning. Prolong or repeat signal until engine occupies the crossing.</td>
</tr>
<tr>
<td>(12) 0 -</td>
<td>Inspect brake system for leaks or sticking brakes.</td>
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</tbody>
</table>

## Engine Bell

Ring the engine bell under any of the following conditions:

- Before moving, except when making momentary stop and start switching movements.
- As a warning signal anytime it is necessary.
- When approaching public crossings at grade with the engine in front, as follows:
  - If distance permits, ringing must begin at least 1/4 mile before the public crossing and continue until the crossing is occupied.
  - If distance does not permit, ringing must begin soon enough before the crossing to provide a warning and continue until the crossing is occupied.