PAPER SIGNAL OPERATIONS

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Online Resources: pittsburghmainline.weebly.com/paper-signals

* Track Authority - Means of permitting occupancy on a given segment of track, needed for all railroads with more than one train
  + Common themes across systems – safety, redundancy, documentation
  + All railroads require a Rule Book, Timetable, and means of communication
* Types of Track Authority – Must consider era, prototype, and traffic level
  + Time Table and Train Order (TT&TO)
    - Time Table gives scheduled trains to run within established time limits
    - Train Orders amend schedule or create extras
      * Hooped up to crews at train order stations
    - Generally extinct
  + Track Warrant Control (TWC)
    - Modern version of TT&TO
    - Includes Form D operation and Manual Block (Direct Traffic Control)
    - Generally used for lower traffic volumes
    - Conveyed via radio from dispatcher to crew who copies on paper
  + Yard Limits (Rule 93)
    - Given by yard master if present, otherwise given by dispatcher
    - Gives permission to operate within defined yard limits at restricted speed
  + Automatic Block Signaling (ABS)
    - Single (Rule 251) or Bidirectional (Rule 261)
    - Signals operate automatically for a straight segment of track based on occupancy
    - Signals default to highest aspect in preferred direction of traffic
  + Centralized Traffic Control (CTC)
    - Dispatcher controls signals and turnouts within interlockings (control points)
    - Often includes dispatcher controlled control points separated by segments of ABS
* Signal Terminology
  + Absolute Signal – No number plate, located at control points, stop is absolute stop
  + Intermediate Signal – Number plates, between control points, stop is stop and proceed
  + Control Point (CP) – Location of absolute signals governing dispatcher-controlled turnouts connecting mainline tracks such as at a crossover or passing siding
  + Speeds
    - Normal Speed – Maximum speed authorized by timetable
    - Medium Speed – Not exceeding 30 MPH (used to take diverging route)
    - Restricted Speed – A speed which will permit stopping in one half the range of vision not exceeding 15 MPH (used in yards)
  + Rule/Name/Aspect/Indication – All signals assigned these designations in rule book
    - Reading Aspects – If it’s not all Red, it’s not Red at all
    - Vertically-aligned heads are for same track
    - The higher the head the higher the speed it governs
* Paper Signals – April 2017 Model Railroader article by Bruce Carpenter
  + Inexpensive, simple, temporary, learning tool
  + Follow prototype for ABS/CTC combination
* Implementing Paper Signals
  + Locations
    - Locate and name control points and place signal base at every entrance to interlocking
    - Break up segments between CPs into blocks with intermediate signals
    - Install Plastic Game Piece Holders found on Amazon with double-sided foam tape at all block signal locations and entrances to control points
  + Learn Indications
    - Follow the prototype
    - Stick to one type of signal at first
    - Eliminate unnecessary indications – no need for advance, slow, or limited speed
  + Sample Signal Progressions
    - Straight Route to a Stop
      * Clear, Approach, Stop
    - Cross over and continue
      * Clear, Approach Medium, Medium Clear, Clear
    - Cross over and stop
      * Clear, Approach Medium, Medium Approach, Stop
    - Leave Signaled Territory
      * Clear, Approach, Restricting
  + Making Signals
    - Draw on CAD or Word Processor (PRR Signals available on my website)
    - Print on Cardstock and Laminate
  + Staging Signals
    - Install Signal Holders for extra aspects on fascia at each interlocking
      * Make from square plastic fence post
    - Super glue Stop into all Bases (Or Restricting for leaving signaled territory)
      * Only glue from back to allow another aspect to be placed in front
    - Place exactly as many aspects in each holder as will possibly be needed at each location
  + Operating
    - Dispatcher – Decides route and how far each train may proceed
    - Signal Setter – Sets signals and turnouts according to route, working backward towards the train’s present location
    - Crew – “Knocks Down” signals as each is passed, placing them back in holders, and calls out signals over radio