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