



Signal Training Bulletin

**Committee G: Education & Training
Communication & Signal Division, AAR**

F-1 Automatic Block Signal System

Approved December 1981

Definition: A series of consecutive blocks governed by block signals, cab signals or both, actuated by a train, or engine, or by certain conditions affecting the use of a block.

Symbol: None

Description: Automatic block signal (ABS) systems are used to provide a definite space interval between trains. ABS can be used in single-direction territory to provide for follow-up moves only, by monitoring the condition of the applicable track circuits within the block.

In bi-directional territory, ABS can be modified by using the principle of overlapping to provide some measure of opposing movement protection; or it can be converted to absolute permissive block (APB) which will be discussed in another Signal Training Bulletin.

Purpose and Application: Automatic block signal systems are employed on major traffic routes to maintain a safe spacing between trains operating in the same direction and, if the principle of overlapping is used, to prevent trains moving towards each other on the same track entering a section of track such that their continued progress would be obstructed.

General Information: In automatic block territory, the operating conditions dictate the distance between these signals but, in general, they are located so that train movements can always be controlled in accordance with the indications conveyed by the aspects displayed by the signals with normal application of the brakes. The signal aspects usually convey three indications: Stop, Approach and Proceed. Systems are designed so that under normal operating conditions, signal aspect displaying an Approach indication will always be presented by a signal in approach to one which will require the train to be stopped. Signals convey indication by semaphore arms (together with colored lights for night indication) or color lights only. Signal controls are interconnected with one another depending upon the type of system involved. The blocks over which these signals govern movement are normally only the section between signals.

Detailed Operation: In single-direction ABS territory, two primary conditions must be checked before a signal can display an aspect indicating Proceed. The first check is to determine the condition of the block over which the signal governs entry. This can be done by monitoring the condition of the appropriate track relays as illustrated in Figure 1. The



Figure 1

second check is to determine the condition of the block which is governed by the next signal in order to allow for an aspect indicating Approach, in advance of any signal

displaying an aspect indicating Stop. This can be accomplished by determining the condition of the control (H) relay that controls the next signal. Refer to Figure 2. Once

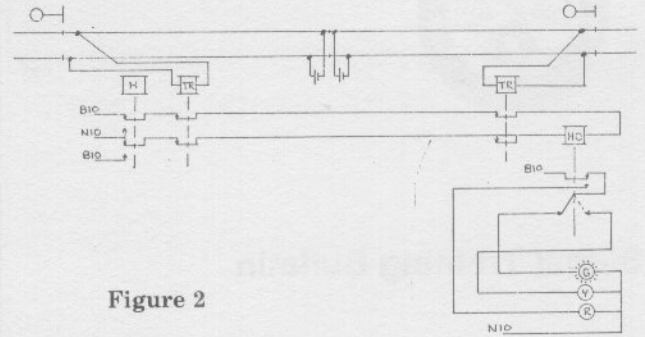


Figure 2

these two conditions are met, the signal will display an aspect indicating Proceed.

In bi-directional ABS territory, train movements in opposite directions must also be considered. To provide some measure of protection against opposing moves, the principle of overlapping can be employed in conjunction with the basic ABS system. The principle of overlapping is defined by the AAR as "The distance the control of one signal extends into the territory which another signal or signals govern." This can be accomplished by extending the distance of track that is checked by the control relay beyond the block that is governed by the signal, as shown in Figure 3. By using the principle of overlapping in both directions,

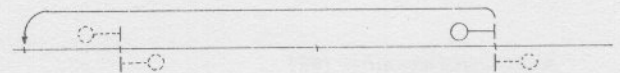


Figure 3

the signal system would provide for at least one block of separation between trains moving in opposite directions, as shown in Figure 4.

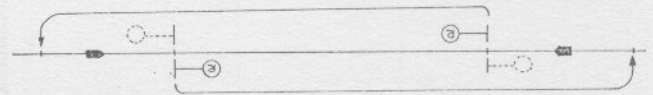


Figure 4

Automatic block signaling is an extension of train orders whereby trains move from station to station by signal indication but when arriving at a station must be controlled via train orders. Although ABS is not the most efficient method of controlling train movement, it does lay the foundation for more advance systems.

Note: This Bulletin is for general information only. For specific applications consult the rules, standards and instructions published by your railroad.