



Traffic Signal Design Manual

ORIGINATOR Director, Bureau of Highway Operations		7-1-7
CHAPTER 7	Sequence of Operations	
SECTION 1	General	
SUBJECT 7	Flashing Yellow Arrow	

The WisMUTCD has instituted a requirement that green balls shall not be used in front of left turn lanes. Flashing yellow arrows (FYA) will begin to be utilized by WisDOT to meet this requirement yet still provide either permissive only OR protected/permissive left turn movements.

The operation of the FYA signal heads is straight forward; however, it does require some additional wiring and programming in the cabinet. The following should detail how to complete a sequence of operations sheet for a traffic signal with a flashing yellow arrow.

Flashing yellow arrows are being handled in the controller via the use of a SPECIAL overlap. This is programmed differently than a typical right turn overlap in the controller. There will be special training and documentation made available for the programming of special overlaps to power the flashing yellow arrow. To simplify and standardize the cabinet wiring, each overlap has been assigned to a specific phase as follows:

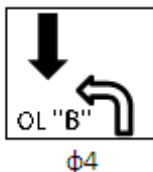
Overlap	Left Turn Phase	Opposing Thru Phase
"A"	1	2
"B"	3	4
"C"	5	6
"D"	7	8

This means that if your design only has one or two FYA operations, you do not simply assign Overlaps A & B, but rather the overlap that is associated with that left turn movement and/or opposing phase as listed in the table above.

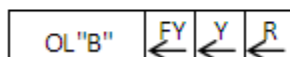
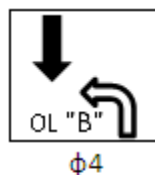
Ring/Barrier Diagram:
Permissive Only:

If your FYA is being operated in permissive mode only, your signal plan will show 3-section arrow head(s) in the following configuration from top to bottom; red arrow, yellow arrow, flashing yellow arrow. The head numbers affiliated with these 3-section arrow heads will be listed in the row for the associated overlap, only.

The overlap will graphically be shown in the same box as the arrow for the opposing through movement. It is recommended that this arrow either have a dotted/dashed pattern, or that it be hollow (with all other non-FYA arrows being filled in) to show that this is a flashing arrow, and not a green arrow (as shown below).



The chart shall show the operations of this overlap under the opposing through phase (as shown below).

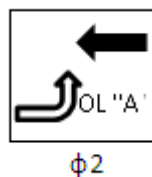
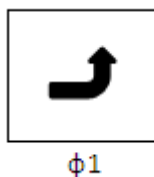


See phases 4 & 8 (and associated Overlaps B & D) in Figure 1, for an example of how permissive only FYAs should look in the ring barrier diagram.

Protected/Permissive:

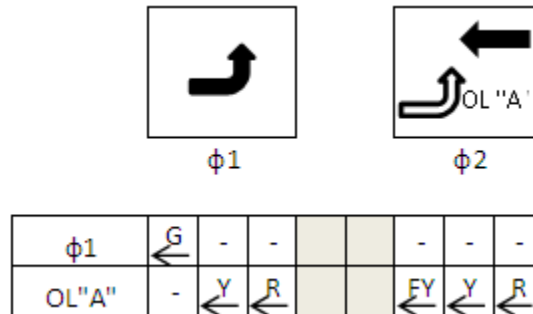
If your FYA is being operated in protected/permissive mode, your signal plan will show 4-section arrow head(s) in the following configuration from top to bottom; red arrow, yellow arrow, flashing yellow arrow, green arrow. The head numbers affiliated with these 4-section arrow heads will be listed in the row for the associated left turn movement **and** in the row for the associated overlap.

The overlap will graphically be shown in the same box as the arrow for the opposing through movement. It is recommended that this arrow either have a dotted/dashed pattern, or that it be hollow (with all other non-FYA arrows being filled in) to show that this is a flashing arrow, and not a green arrow (as shown below).



In the cabinet, the green arrow is powered by the left turn phase (typically phases 1, 3, 5, or 7) and the flashing yellow, solid yellow and solid red arrows are powered by the

overlap. Therefore there will be multiple entries in the ring barrier diagram for these heads (as shown below).



See phases 1, 2, 5, 6 (and associated Overlaps A & C) in Figure 1, for an example of how protected/permisive FYAs should look in the ring barrier diagram.

Also note, the flash operations shall show a red arrow in row associated with the overlap. This is not illustrated in Figure 1.

Special Overlaps:

Since these overlaps are not programmed as standard overlaps, it is important that the typical OVERLAP table not be used for these overlaps on the sequence of operations sheet. Instead, a SPECIAL OVERLAPS table should be inserted, with data filled out for the overlaps that are used and which phase is affiliated with the protected and/or permissive portion of the flashing yellow arrow head operations. See below for an example table that would be affiliated with the Ring Barrier diagram in Figure 1.

SPECIAL OVERLAPS

	PROTECTED	PERMISSIVE
OL "A"	1	2
OL "B"		4
OL "C"	5	6
OL "D"		8

	$\phi 1$			$\phi 2$			$\phi 3$			$\phi 4$							
$\phi 1$		-	-			-	-	-							-	-	-
$\phi 2$	R	R	R			G	Y	R							R	R	R
$\phi 3$																	
$\phi 4$	R	R	R			R	R	R							G	Y	R
$\phi 5$	-	-	-			-	-	-							-	-	-
$\phi 6$	R	R	R			R	R	R							R	R	R
$\phi 7$																	
$\phi 8$	R	R	R			R	R	R							R	R	R
OL "A"	-						Y										
OL "B"																Y	
OL "C"																	
OL "D"																	

