

Making Sense of Canadian Railroad Signals

Brian Keay (keay@ucalgary.ca)

(all photos are mine)



Intermediate to
Bears paw East



Sunalta



Keith East



Bengal



Sunalta



Intermediate signal
to Sunalta looking east.



8th St. SE &
9th Ave. SE



Mewatta

My home layout



8th St. SE &
9th Ave. SE



Mewatta



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Intermediate signal
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8th St. SE &
9th Ave. SE



Mewatta

WHAT DO THESE
SIGNALS MEAN?

LOOK AT ALL THE
COLOUR
COMBINATIONS!

YIKES!!!

I GUESS **RED** MEANS STOP, **GREEN** MEANS GO
AND **YELLOW** MEANS SPEED UP AS IT WILL
CHANGE TO **RED** SOON, LIKE TRAFFIC LIGHTS!



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Intermediate to
Bears paw East

Part 1: Background Information

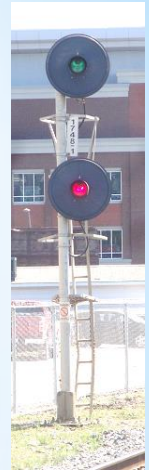
1. References
2. Definitions
3. Why are Signals Necessary?
4. Signal Nomenclature
5. 3 Colours → 3 Meanings
6. 3 Speeds → 3 Heads
7. Combining Colours and Heads

Part 2: How to Read Signals

- 1) Tall Signals
 - 3-Headed Signals
 - 2-Headed Signals
 - 1-Headed Signals
- 2) Dwarf Signals
 - 2-Headed Dwarfs
 - 1-Headed Dwarfs
- 3) Sequences of Signals



Bengal



8th St. SE &
9th Ave. SE

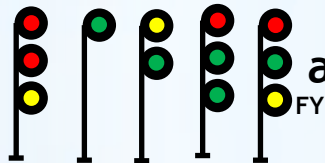


Mewatta looking east.

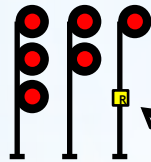
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Topics Include:



a) How to determine what these signals mean?



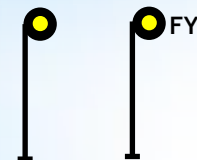
b) Reading 3 vs. 2 vs. 1 headed signals

c) Plaques

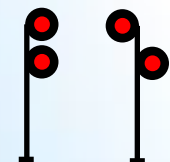
d) Tall vs. dwarf signals



e) Solid vs. Flashing lights



f) Vertical vs. offset heads



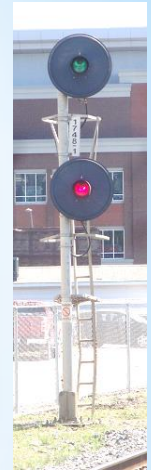
Do these paired signals indicate the same thing?

No! They have Different meanings.

Intermediate to Bears paw East



Bengal



8th St. SE & 9th Ave. SE



Keith east

Keith west



Intermediate signal to Sunalta looking east.



Mewatta looking east.

Making Sense of Canadian Railroad Signals

How did I get interested learning more about signals and their meaning?

a) Installing signals on my layout.



Signals on my layout

b) Visited the CP Rail Training Centre at Ogden in June.

References

c) Useful signal websites:

http://broadway.pennsyr.com/Rail/Signal/learning_the_aspects.html

<http://www.sh1.org/eisenbahn/sac.htm>

<http://www.alkrug.vcn.com/rrfacts/signals/signals.htm>

d) How to read Canadian signals videos:

<https://www.youtube.com/watch?v=16jXTDfEavA>

<https://www.youtube.com/watch?v=tJpR93kp44I>

e) Canadian Rail Operating Rules (CROR) - Dec 26, 2013

<https://www.tc.gc.ca/media/documents/railsafety/TC-O-0167-english.pdf>

f) Book

Railroad Signaling, Brian Solomon, Voyageur Press, St. Paul, MN, USA, 2003



Intermediate to
Bears paw East



8th St. SE &
9th Ave. SE

OMG!!!!!!

This summary sheet of CROR signal rules shows:

- 36 signal rules (#405 - 440);
- 4 plaques, one direction indicator and 125 aspects!

CANADIAN RAIL OPERATING RULES (CROR) – SIGNAL RULES											
	DWARP 	CLEAR SIGNAL Proceed.			ADVANCE CLEAR TO SLOW Proceed, approaching second signal at SLOW speed.			MEDIUM TO LIMITED Proceed, MEDIUM speed passing signal and through turnouts, approaching next signal at LIMITED speed.			SLOW TO LIMITED Proceed, SLOW speed passing signal and through turnouts, approaching next signal at LIMITED speed.
	DWARP 	CLEAR TO LIMITED Proceed, approaching next signal at LIMITED speed.			ADVANCE CLEAR TO STOP Proceed, next signal is displaying Clear to Stop, be prepared to stop at second signal.			MEDIUM TO MEDIUM Proceed, MEDIUM speed passing signal and through turnouts, approaching next signal at MEDIUM speed.			SLOW TO MEDIUM Proceed, SLOW speed passing signal and through turnouts, approaching next signal at MEDIUM speed.
	DWARP 	CLEAR TO MEDIUM Proceed, approaching next signal at MEDIUM speed.		DWARP 	LIMITED TO CLEAR Proceed, LIMITED speed passing signal and through turnouts.		DWARP 	MEDIUM TO SLOW Proceed, MEDIUM speed passing signal and through turnouts, approaching next signal at SLOW speed.			SLOW TO SLOW Proceed, SLOW speed passing signal and through turnouts, approaching next signal at SLOW speed.
	DWARP 	CLEAR TO DIVERGING Proceed, approaching next signal at DIVERGING speed. <i>(DV plaque required, as shown)</i>			LIMITED TO LIMITED Proceed, LIMITED speed passing signal and through turnouts, approaching next signal at LIMITED speed.		DWARP 	MEDIUM TO RESTRICTING Proceed, MEDIUM speed passing signal and through turnouts, next signal is displaying restricting signal.		DWARP 	SLOW TO STOP Proceed, SLOW speed passing signal and through turnouts, preparing to stop at next signal.
	DWARP 	CLEAR TO SLOW Proceed, approaching next signal at SLOW speed.			LIMITED TO MEDIUM Proceed, LIMITED speed passing signal and through turnouts, approaching next signal at MEDIUM speed.		DWARP 	MEDIUM TO STOP Proceed, MEDIUM speed passing signal and through turnouts, preparing to stop at next signal.		DWARP 	RESTRICTING SIGNAL Proceed at RESTRICTED speed.
		CLEAR TO RESTRICTING Proceed, next signal is displaying restricting signal.		DWARP 	LIMITED TO SLOW Proceed, LIMITED speed passing signal and through turnouts, approaching next signal at SLOW speed.		DWARP 	DIVERGING TO CLEAR Proceed, DIVERGING speed passing signal and through turnouts. <i>(DV plaque required, as shown)</i>			STOP AND PROCEED SIGNAL Stop, then proceed at RESTRICTED speed.
		CLEAR TO STOP Proceed, preparing to stop at next signal.		DWARP 	LIMITED TO RESTRICTING Proceed, LIMITED speed passing signal and through turnouts, next signal is displaying restricting signal.		DWARP 	DIVERGING TO STOP Proceed, DIVERGING speed passing signal and through turnouts preparing to stop at next signal. <i>(DV plaque required, as shown)</i>		DWARP 	TAKE/LEAVE SIDING SIGNAL Indications will be specified in special instructions for each specific application of this signal.
		ADVANCE CLEAR TO LIMITED Proceed, approaching second signal at LIMITED speed.		DWARP 	LIMITED TO STOP Proceed, LIMITED speed passing signal and through turnouts, preparing to stop at next signal.		DWARP 	DIVERGING Proceed at REDUCED speed, not exceeding DIVERGING speed passing signal and through turnouts. <i>(DV plaque required, as shown)</i>		DWARP 	STOP SIGNAL Stop. <i>OPTIONAL:</i> Unless required to clear a switch, crossing, controlled location, or spotting passenger equipment on station platforms, a train or engine not authorized by Rule 50-4 must stop at least 300 feet in advance of the STOP signal.
		ADVANCE CLEAR TO MEDIUM Proceed, approaching second signal at MEDIUM speed.		DWARP 	MEDIUM TO CLEAR Proceed, MEDIUM speed passing signal and through turnouts.		DWARP 	SLOW TO CLEAR Proceed, SLOW speed passing signal and through turnouts.			DIRECTION INDICATOR Flashing arrow indicators attached to block signals when illuminated, identify that the route at the next controlled location is displaying a permissive signal and the route is lined and secured as indicated by the direction of the arrow.
429 / 435 / 437		408 / 420 / 429 / 430		406 / 416 / 419 / 420 / 421		436		LIMITED SPEED 45 MPH MEDIUM SPEED 30 MPH DIVERGING SPEED 25 MPH SLOW SPEED 15 MPH REDUCED SPEED Able to stop within one-half the range of vision of equipment. RESTRICTED SPEED Able to stop within one-half the range of vision of equipment, not less than 100 feet, but in no case exceeding SLOW speed.			
ABSOLUTE PLAQUE This sign marks an absolute signal. A signal bearing this sign cannot convey Rule 437.		DIVERGING PLAQUE This sign marks a signal that displays "diverging" aspects, as opposed to the standard speed-signaling aspects.		LIMITED PLAQUE The presence of this sign upgrades MEDIUM speed aspects to LIMITED speed.		RESTRICTING PLAQUE The presence of this sign upgrades a Rule 437 Stop and Proceed aspect to a Rule 436 Restricting aspect.					
© 2008 JOSEPH HOEVEY, L.L.H. RULES MAY/2008 NOT AN OFFICIAL RAILROAD REFERENCE. NOT FOR USE BY ACTUAL RAILROAD EMPLOYEES. LAMP FLASHING FROM SIGNAL LAMP INDICATE FLASHING ASPECT REVISION #0 - 071119											

<http://signals.jovet.net/rules/CROR%20Signal%20Rules.pdf>

The above CROR signals seem to be an arbitrary collection of coloured and blinking lights that make no logical sense that have to be memorized.

I hope to show you that they are not arbitrary and there is a system.....

Summary of Rules for Signals

1-Headed Signals (adding imaginary red heads)

If there is only one head on a signal, add 2 'imaginary red' (IR) heads below the existing head

2-Headed Signals (adding imaginary red heads)

If there are only 2 heads on a signal, then an 'imaginary red' (IR) aspect is added as follows:

- a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red';
- b) if neither of the two heads is 'red', add the 'imaginary red' to the bottom of the existing 2 aspects

3-Headed Signals

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED = STOP**)

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop";

Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";

Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear";

Rule 4: If you have two coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____";

Rule 5: If there are two coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

From: \ To:	Clear	Limited	Medium	Slow	Stop	Other
Clear						
Limited						
Medium						
Slow						

By the end of this presentation we will fill in this entire table using 5 simple steps!!

Through the 5 steps, we will learn how to determine the meaning of 24 of the 36 CROR rules.

By simple analogy, you should then be able to read and understand the meaning of the remaining 12 CROR rules.

Yes, there is even an App for reading signals

<http://www.rcp.ca/mobile/>

\$7.99

Rob Chandler's

Mobile Apps

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[BOOKMARK](#) [f](#) [t](#) [e](#)

Canadian Rail Operating Rules Signals & Interpretations

[Blink](#) [Solve](#) [Staggered](#) [Game](#)

Standard Interpretation

Mode: ☒ Full ☐ Part ☐ Basic

Rule#: Signal Type:

Name: Rev: 3.3beta1 [Bld:ww-1.0.4.11-140526]

Action: * A few basic signal reading 'TIPS' are available.

[Tips](#) * Not sure of the proper signal name? 'CLUE?' lists all signal numbers and their names.

[Clue?](#)

[Complete CROR documentation](#) [Comments & suggestions](#) [Our website](#)

Available for your: [Android \(Amazon\)](#) | [Android \(Google\)](#)
[iPad / iPhone](#) | [BlackBerry PlayBook & BB10 devices](#)

Canadian Railway Signals & Interpretations

Initially written as a web based utility to assist in learning standard CROR railway signals during my Railway Association of Canada Railway Conductor course (it looks like necessity really is the mother of invention). Other students saw it and said "you should make it into a mobile app", so here it is. A basic demo version without the "game" function is shown below in case you'd like to try it out.

The following standard CROR signal combinations are included in the mobile version:

- Mast style with single, double and triple aspects.
- Staggered and non-staggered aspects.
- Single and double aspect dwarf signals.
- Letter plates (except double letter plate signals).

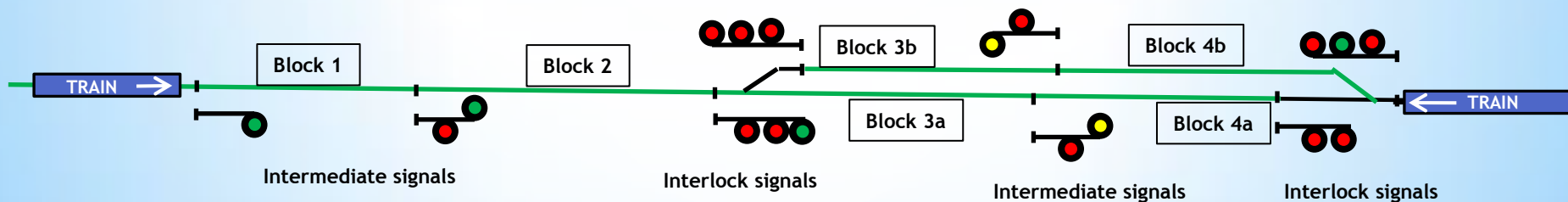
You can either select your own signal pattern and mast style or have some "fun" and let the system pick a pattern for you (Game). "Game" mode is a great way to learn railway signals and is much better than practicing with the standard issue flashcards.

All valid signals are fully explained, including the CROR rule number, correct signal name and the action to be taken.

Why are Signals Necessary?

Signals Indicate:

1. if the line ahead is clear, occupied, or if there are track problems (e.g. broken rail);
2. if the engineer has permission to proceed or stop;
3. if turnouts are set correctly;
4. which way the turnout(s) are set;
5. the maximum train speed for the signal it is approaching;
6. the maximum speed the train should approach the next signal at; and
7. in some cases, the state of the signal that is 2 or 3 blocks ahead.





Sunalta looking west

Signal mast

light

Signal Nomenclature

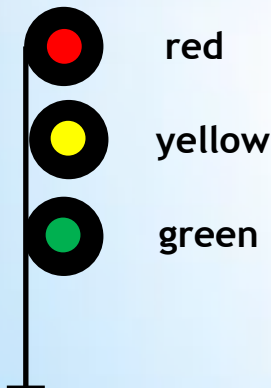
Signal head

Aspect: one of a series of allowed options for the visual pattern of a signal mast to convey a speed and/or route indication.

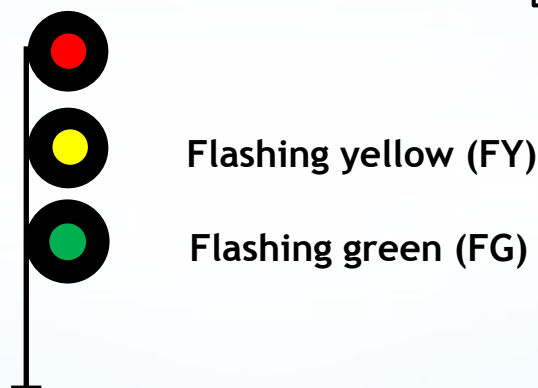
The indication typically dictates the maximum speed a train may pass that signal and at what maximum speed the train is authorized to be travelling when it arrives at the next signal.

The visual pattern of an aspect can contain a combination of lit signal heads (solid or blinking), plaques and/or direction indicators;

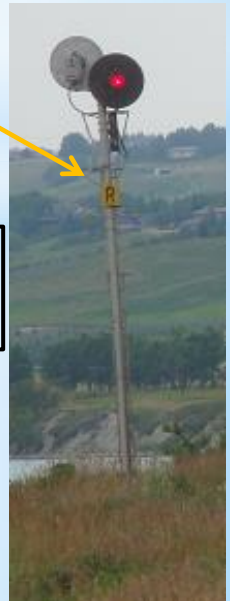
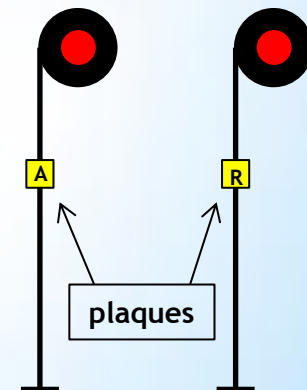
Colours



And

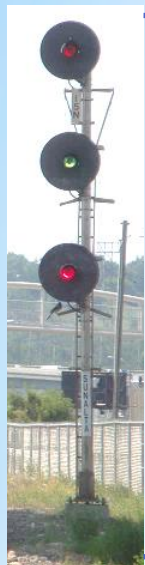


Features



Intermediate to Bears paw East

Signal Nomenclature



Sunalta looking west

Signal mast

light



Signal head

Aspect: one of a series of allowed options for the visual pattern of a signal mast to convey a speed and/or route indication.

The indication typically dictates the maximum speed a train may pass that signal and at what maximum speed the train is authorized to be travelling when it arrives at the next signal.

The visual pattern of an aspect can contain a combination of lit signal heads (solid or blinking), plaques and/or direction indicators;

Every **Aspect** has a CROR Rule# & Title associated with it;

Every Rule# & Title has an **Indication** associate with it;

Indication: the message an **Aspect** conveys to the crew

Examples:

<u>Aspect</u>	<u>Rule # and Title</u>	<u>Indication</u>
	Rule 422: Medium to Clear	Proceed, MEDIUM speed passing signal and through turnouts; next signal is clear
<u>Aspect</u>	<u>Rule # and Title</u>	<u>Indication</u>
	Rule 436: Restricting Signal	Proceed at RESTRICTED speed.



Intermediate to Bears paw East

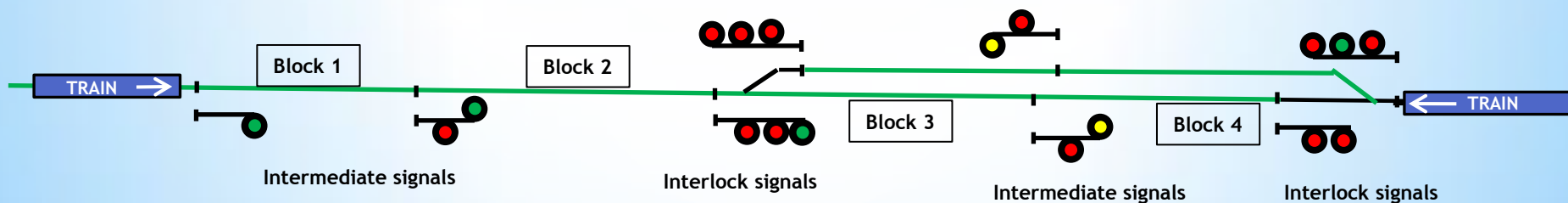
3 Colours.....3 Meanings.

Colours have the same meaning no matter which head they are in.

 ← **GREEN** means that at least TWO blocks beyond this signal are clear.

 ← **YELLOW** means that only ONE block beyond this signal is clear and this route is impassable at the next signal.

 ← **RED** means that this route is impassable.



3 General Speeds.....3 Heads.

Highest speed

(Normal route
through switches)

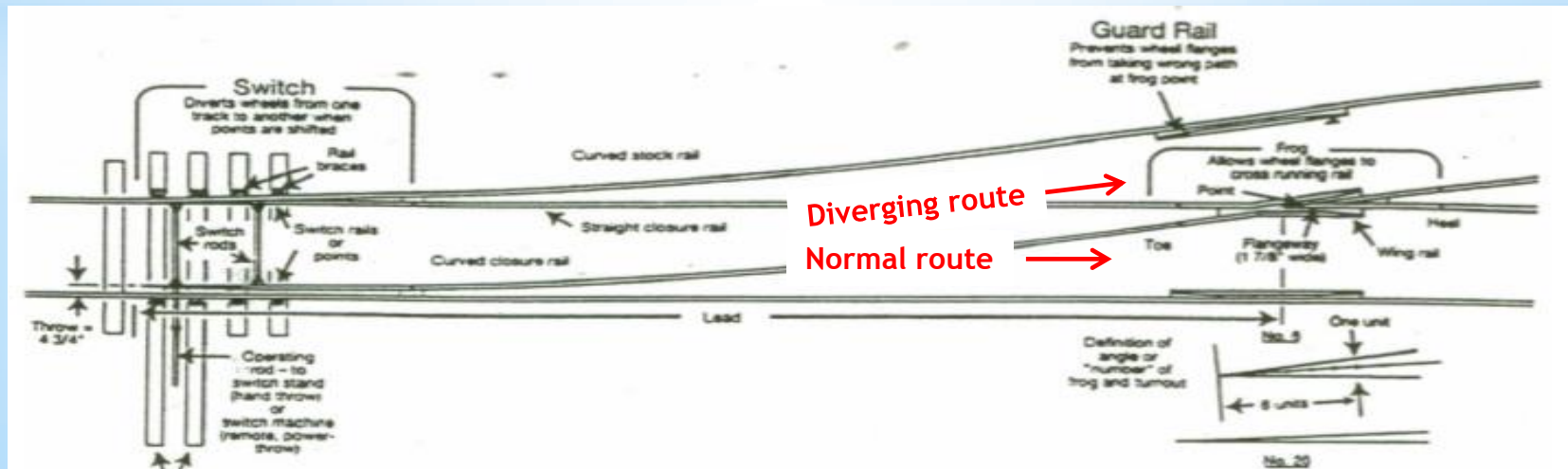
Intermediate speeds

(Diverging route
through long switches)

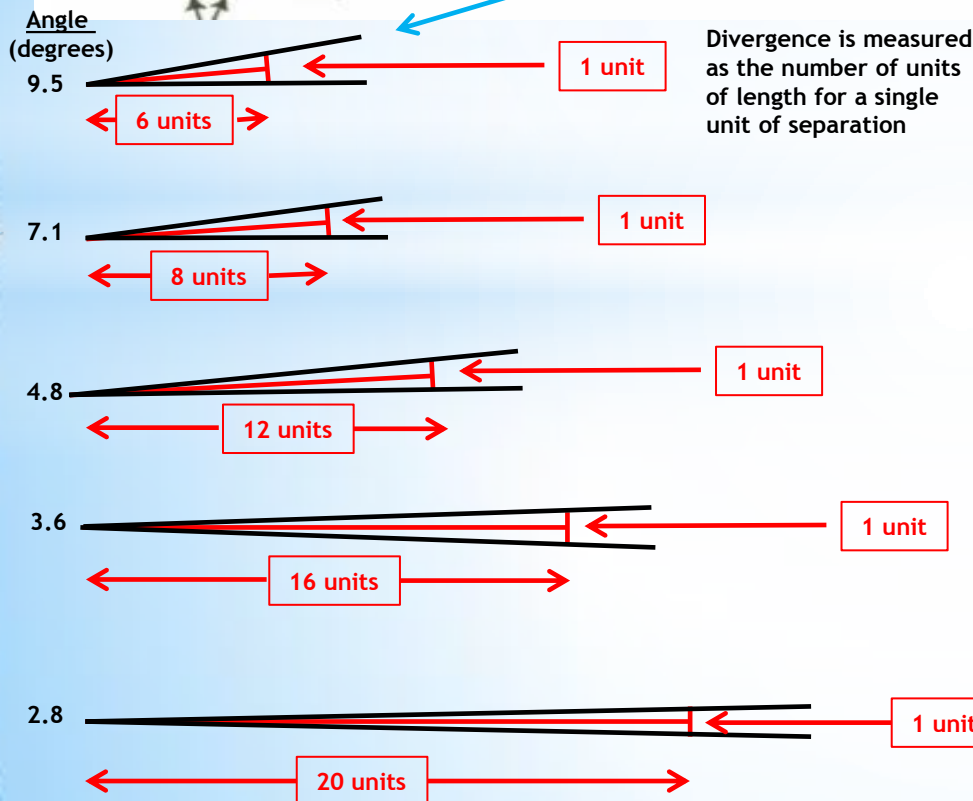
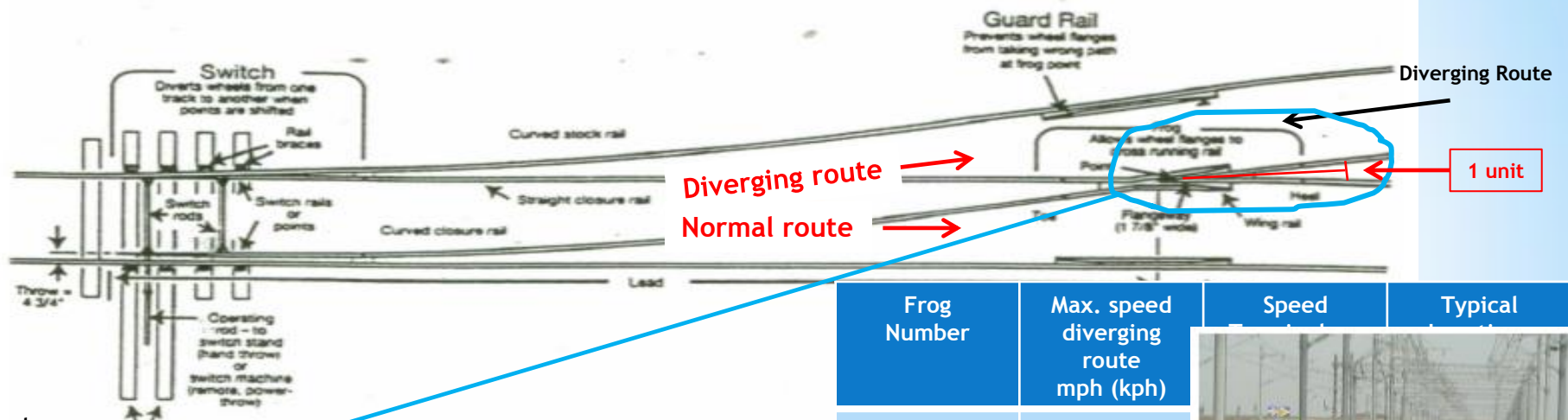
Slowest speeds

(Diverging route
through short switches)

What is meant by 'long' and 'short' switches?



Switch Frog Numbers and Track Speeds



Frog Number	Max. speed diverging route mph (kph)	Speed	Typical
6	10 (16)		
8	15 (24)		
12	25 (40)		
16	30 (48)		
20	45 (72)		



LGV East at Chauconin, France

Others

26.5

32.7

Non-gapped frogs

Others

60 (96)

80 (129)

143 (230) in Europe & Japan

Track speed

Main Line

non-gapped frogs.

3 General Speeds → 5 Track Speeds...3 Heads

The higher the head is on the pole, the higher the permissible speed.

Highest speed
(straight ahead
through switches)

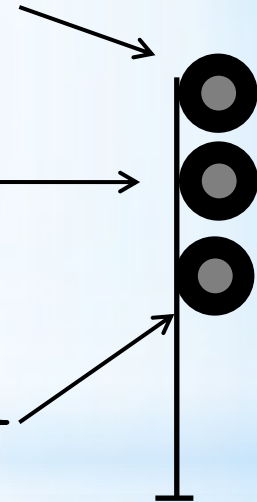
→ { **Clear signal:** proceed at track speed

Intermediate speeds
(diverging route
through long switches)

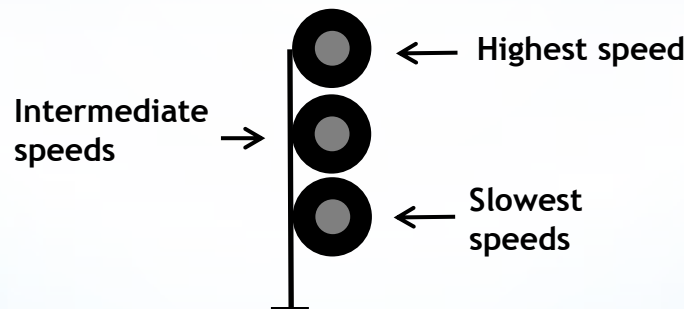
→ { **Limited Speed:** speed ≤ 45 mph (72 km/h)
Medium Speed: speed ≤ 30 mph (48 km/h) }

Slowest speeds
(diverging route
through short switches)

→ { **Slow Speed:** speed ≤ 15 mph (24 km/h)
Restricted Speed: speed that permits stopping
within one-half the range of vision and never
exceeding **SLOW** speed }



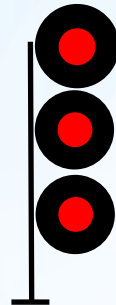
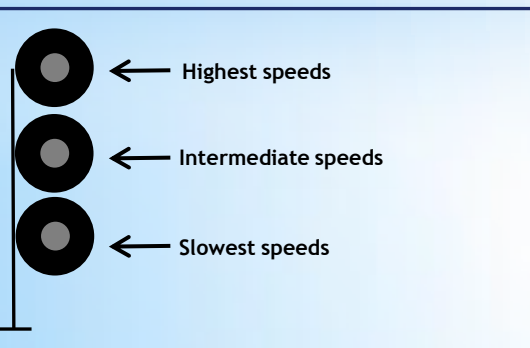
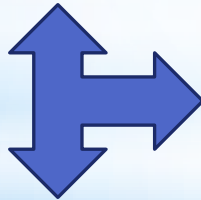
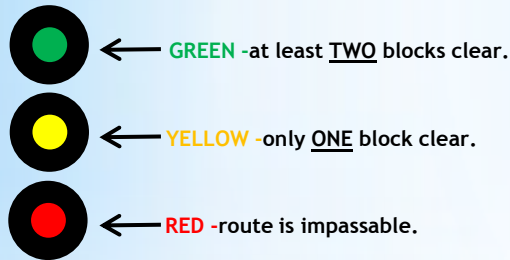
To Summarize



Diverging Speed: speed ≤ 25 mph (40 km/h) - will not be covered

Combining Colours with Head Positions

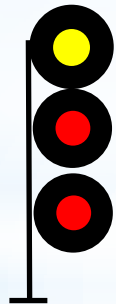
Colours have the same meaning no matter which head they are in.



High speed route is impassable.

Intermediate speed route is impassable.

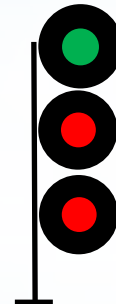
Slowest speed route is impassable.



High speed route is clear for 1 block, prepare to stop at next signal.

Intermediate speed route is impassable.

Slowest speed route is impassable.



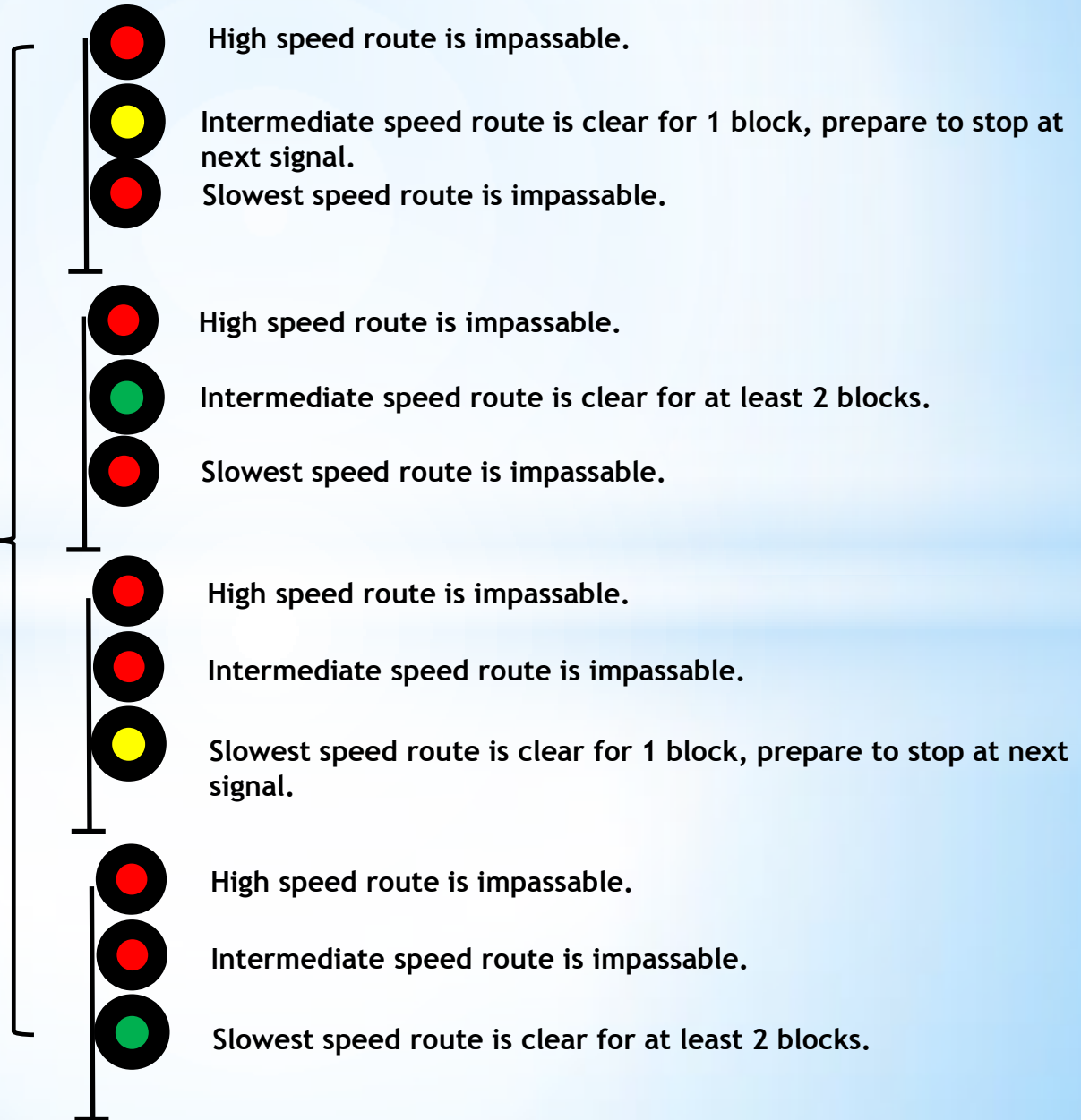
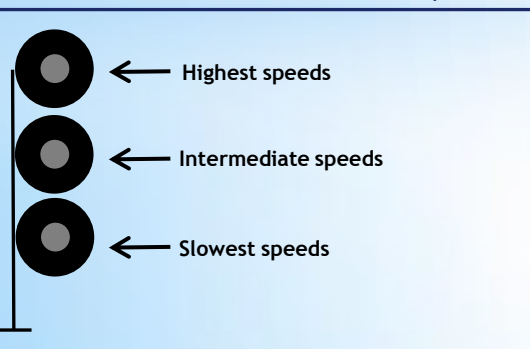
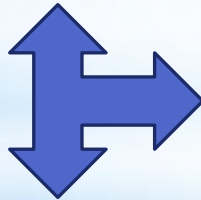
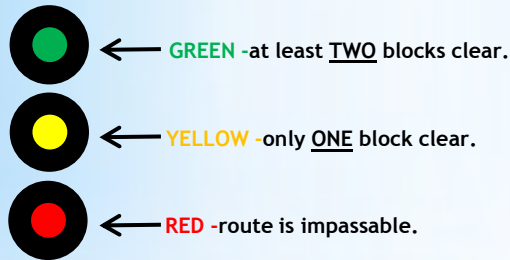
High speed route is clear for at least 2 blocks.

Intermediate speed route is impassable.

Slowest speed route is impassable.

Combining Colours with Head Positions

Colours have the same meaning no matter which head they are in.



RECALL 3 General Speeds → 5 Track Speeds...3 Heads

The higher the head is on the pole, the higher the permissible speed.

Highest speed
(normal route
through switches)

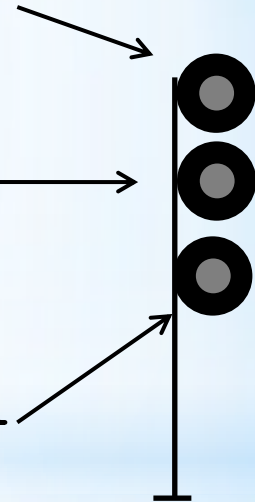
→ { **Clear signal:** proceed at track speed

Intermediate speeds
(diverging route
through long switches)

→ { **Limited Speed:** speed ≤ 45 mph (72 km/h)
Medium Speed: speed ≤ 30 mph (48 km/h) }

Slowest speeds
(diverging route
through short switches)

→ { **Slow Speed:** speed ≤ 15 mph (24 km/h)
Restricted Speed: speed that permits stopping
within one-half the range of vision and never
exceeding **SLOW** speed }



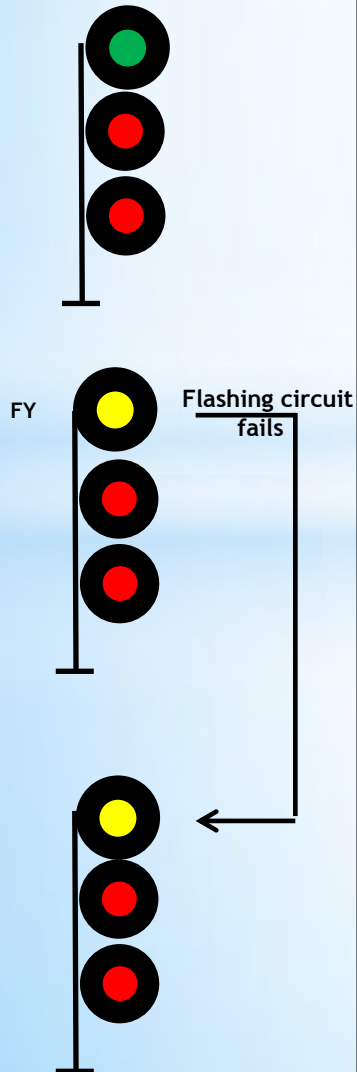
Notice that the top Head only needs to indicate one speed, i.e. 'track speed',
but the middle and bottom Heads need to indicate two speeds.

HOW IS THIS DONE?

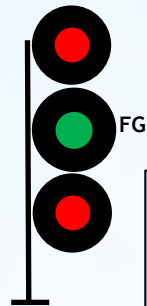
Track Speeds with a Single Green or Yellow 3-Headed Signal

Position of the upper most non-red light indicates the speed required at that signal.

Track Speed



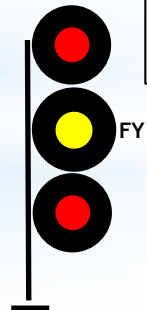
Limited Speed (≤ 45 mph)



FG

Flashing circuit fails

Flashing Heads are less restrictive than solid aspects. Thus if the electronic circuit controlling the flash fails, the signal will default to a solid aspect, which is more restrictive.



FY

Flashing circuit fails

Medium Speed (≤ 30 mph)



Slow Speed (≤ 15 mph)



Flashing circuit fails

Restricted Speed

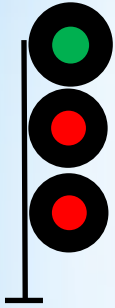


Restricted Speed: speed that permits stopping within one-half the range of vision and never exceeding SLOW speed

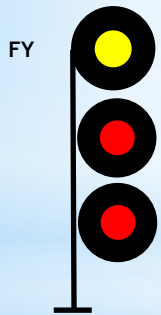
Important: This summary slide only tells you the maximum train speed when a 3-headed signal shows a single green or yellow light; not what the aspect is indicating to the train crew!

General Bulletin Orders (GBOs) are Used to Limit Train Speeds on the Main Line

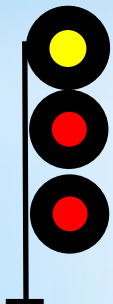
Clear → Track Speed (controlled by speed limit signs or orders)



Rule 405 - Clear Signal - proceed at (or below) allowed track speed.



Rule 415 - Advanced Clear to Stop - proceed, next signal is displaying **Clear to Stop**, be prepared to stop at second signal.



Rule 411 - Clear to stop - proceed, preparing to stop at next signal.

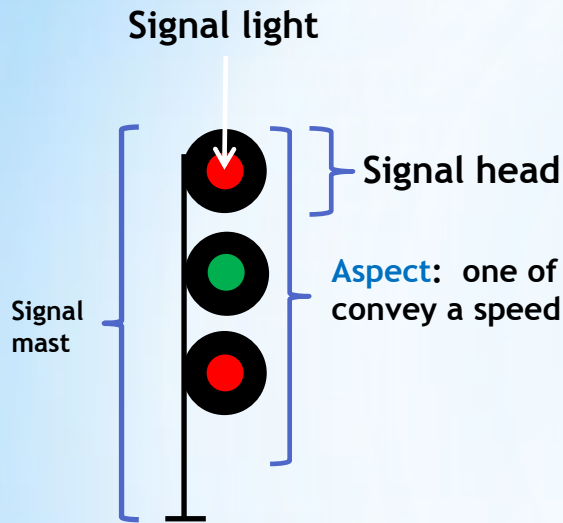
IMPORTANT:

Aspects are not used to control speed limits on the main line when a **Clear** signal is indicated.

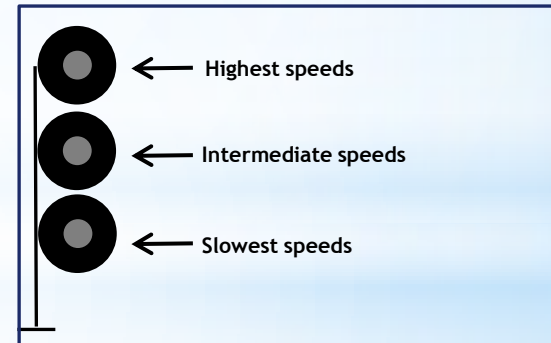
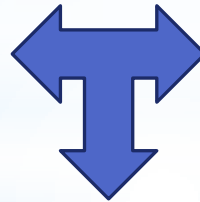
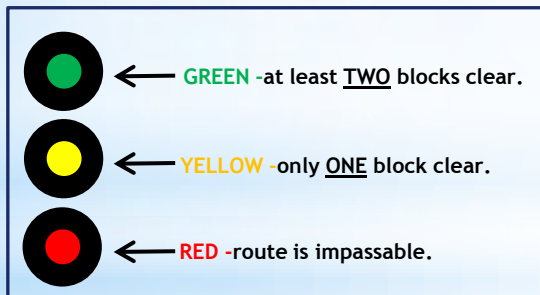
Speed limit signs and/or GBOs are used to control speed limits on the main line.

Limited, medium, slow and restricted aspects are used to indicate train speed due to the train taking a diverging route.

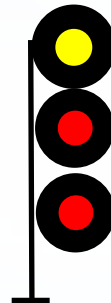
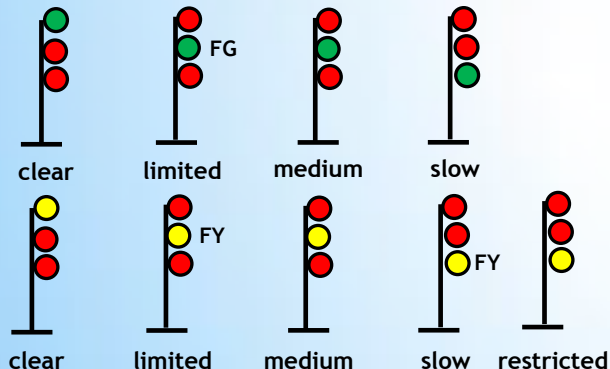
End of Part 1: Summary



Aspect: one of a series of allowed options for the visual pattern of a signal mast to convey a speed and/or route indication.



Single Colour Speed Indications



High speed route is clear for 1 block, prepare to stop at next signal.

Intermediate speed route is impassable.

Slowest speed route is impassable.

Intermission Time

Making Sense of Canadian Railroad Signals

Brian Keay (keay@ucalgary.ca)

(all photos are mine)



Intermediate to
Bears paw East



Sunalta



Keith East



Bengal



Sunalta



Intermediate signal
to Sunalta looking east.



8th St. SE &
9th Ave. SE



Mewatta

My home layout



8th St. SE &
9th Ave. SE



Mewatta



Part 2: How to Read Train Signals

a) Tall Signals

3-Headed Signals

Five simple rules.

2-Headed Signals

Two additional rules.

1-Headed Signals

One additional rule.



Sunalta



Bengal



Intermediate to
Bears paw East

b) Dwarf Signals

2-Headed Dwarfs

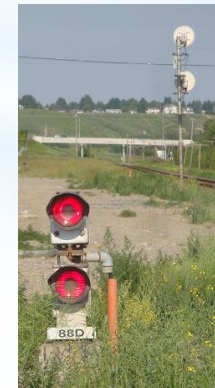
Four rules.

1-Headed Dwarfs

One rule.

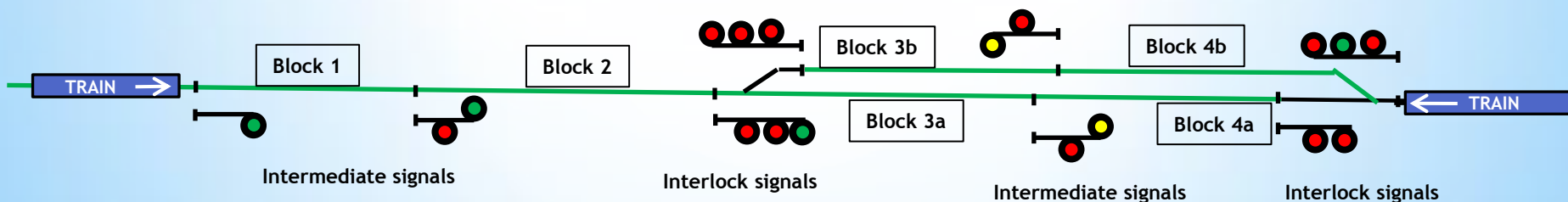


Keith West



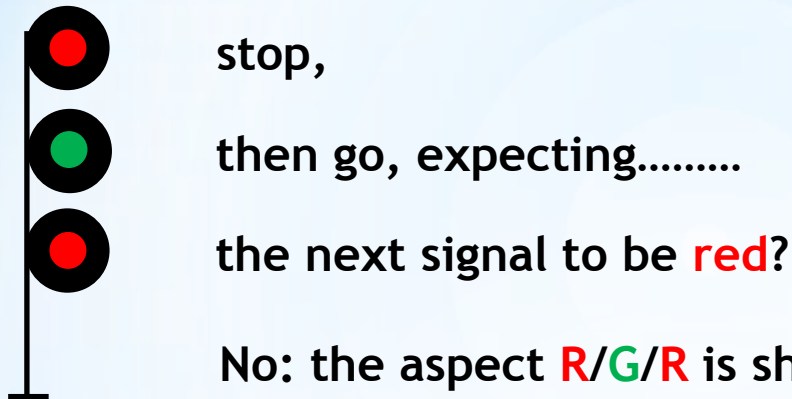
Keith East

c) Sequences of Signals



Simple Rules to Learn the Meaning of Aspects

Does this signal mean:



WHY? Because  are considered as placeholders when one or more of the colours are not **red**.

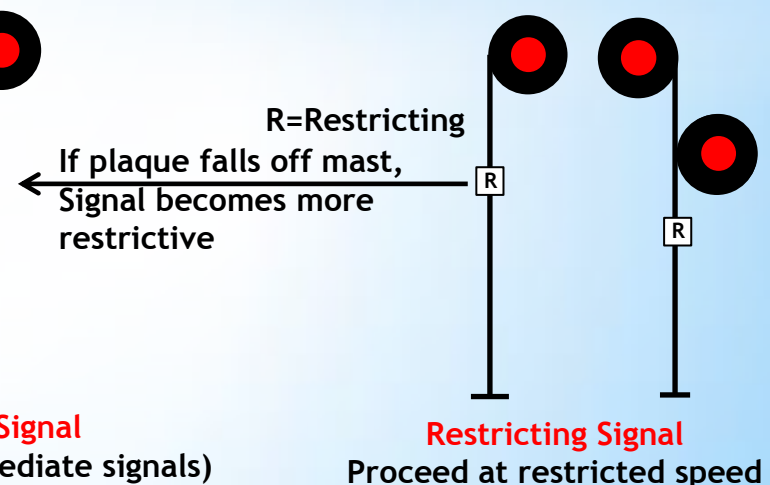
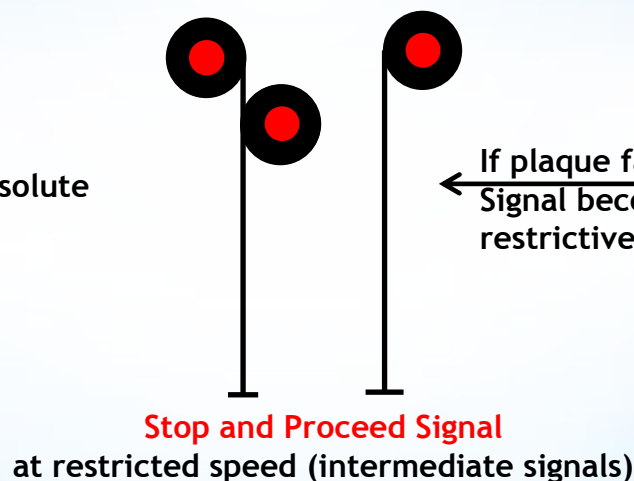
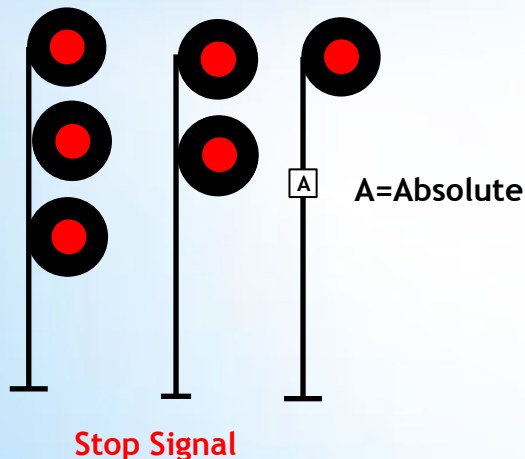


Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED = STOP**)

If all heads are **ALL red**, then.....



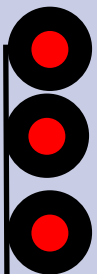
Mewatta



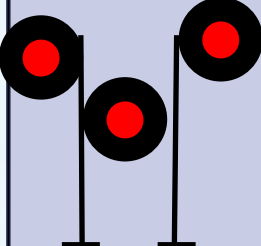
Intermediate to Bears paw East

From:\nTo:	Clear	Limited	Medium	Slow	Stop
Clear					
Limited					
Medium					
Slow					

Other

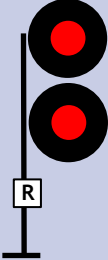


Stop



Stop and Proceed
at restricted speed

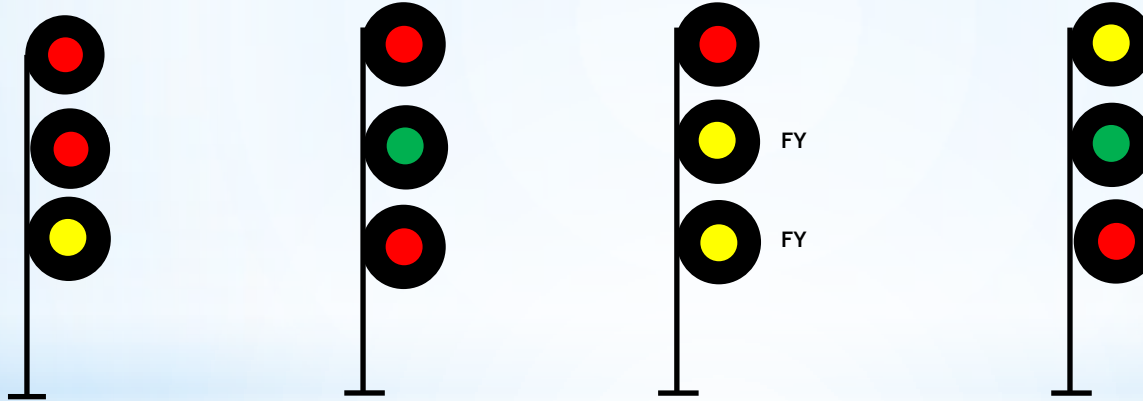
Restricting



Simple Rules to Learn the Meaning of Aspects

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED** = **STOP**)

So, none of these signals mean 'stop and then do something' or 'do something and then stop'.



The **red** lights
are placeholders!

IMPORTANT:

Unless **ALL** the lights in a signal are **red**, the signal is some form of proceed signal and it does not require the train to stop at it.

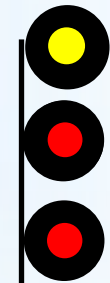
Simple Rules to Learn the Meaning of Aspects

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop"; (Possibilities are: clear, advanced clear, limited, medium, and slow).

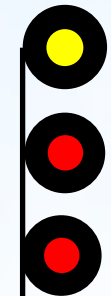
Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";



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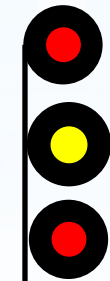


Clear to Stop
(Proceed preparing to stop at next signal.)



FY

Advanced Clear to Stop
(not seen in Calgary) Proceed preparing to stop at 2nd signal



FY

Limited to Stop
(not seen in Calgary)



Medium to Stop
(Proceed, Medium speed and through turnouts, preparing to stop at next signal)

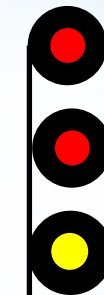


Mewatta



FY

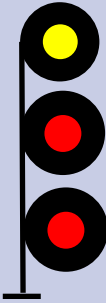
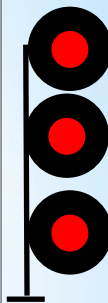
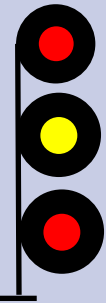
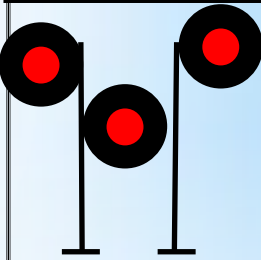
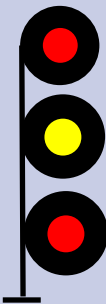
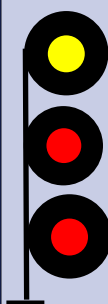
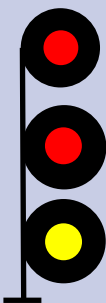
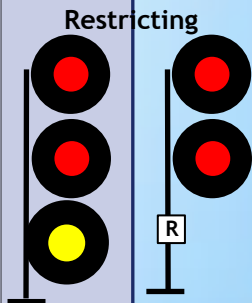
Slow to Stop
(Proceed, Slow speed and through turnouts, preparing to stop at next signal)



Restricting
(Proceed at restricting speed.)



8th St SE & 9th Ave SE

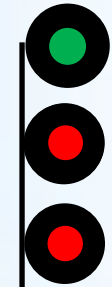
From:\nTo:	Clear	Limited	Medium	Slow	Stop	Other
Clear						 Stop
Limited					 FY	 Stop and Proceed at restricted speed
Medium						 FY Advanced clear to Stop
Slow					 FY	 Restricting

Simple Rules to Learn the Meaning of Aspects

Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear"; Possibilities are: clear, limited, medium, slow



Keith West



Clear to Clear or simply
"clear signal at _____"



FG

Limited to Clear
(not seen in Calgary)

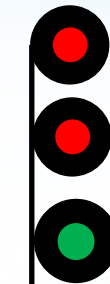


Medium to Clear
(Proceed, Medium speed
passing signal and through
turnouts)



Mewatta

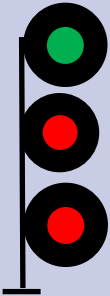
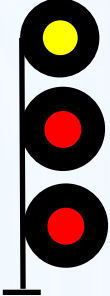
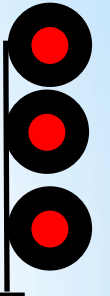
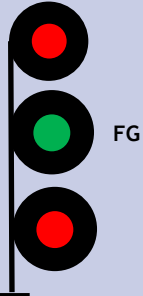
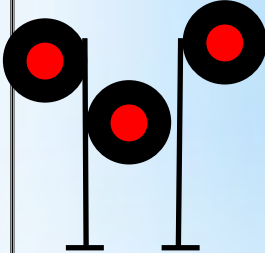
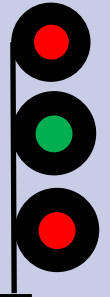
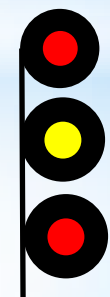
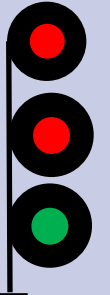
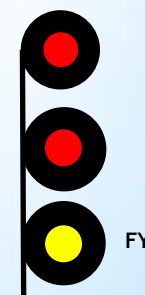
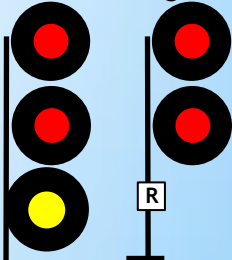
Intermediate to Bears paw East



Slow to Clear
(Proceed, Slow speed
passing signal and
through turnouts)



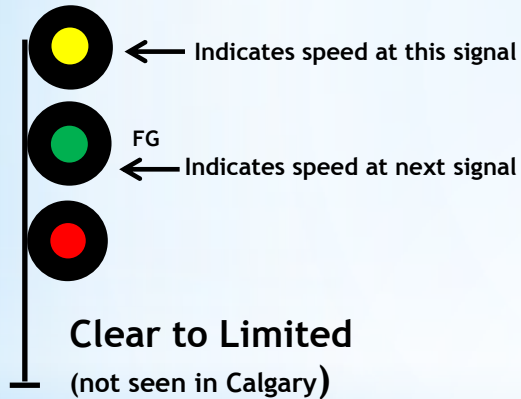
8th St SE & 9th Ave SE

From: \ To:	Clear	Limited	Medium	Slow	Stop	Other
Clear						 Stop
Limited	 FG				 FY	 Stop and Proceed at restricted speed
Medium						 FY Advanced clear to Stop
Slow					 FY	 Restricting

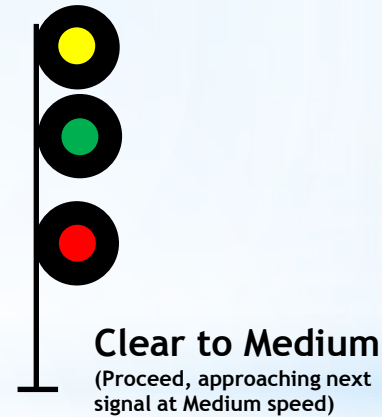
Simple Rules to Learn the Meaning of Aspects

Rule 4: If you have **TWO** coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____"; Possibilities are : limited, medium, slow

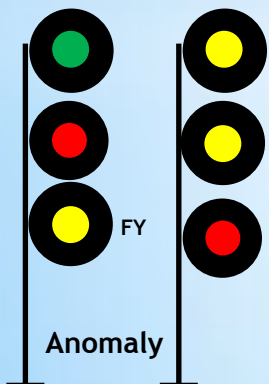
*******Warning of a speed restriction at the next signal!*******



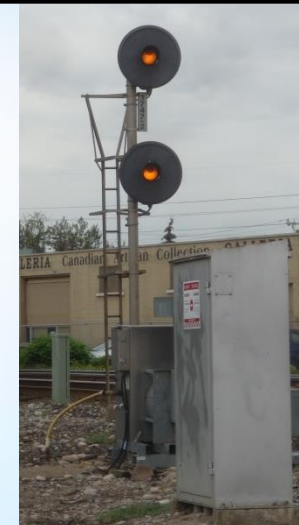
Intermediate between Brickburn and Sunalta looking east



Clear to Slow
(Proceed, approaching next signal at Slow speed)



Mewatta



8th St SE &
9th Ave SE

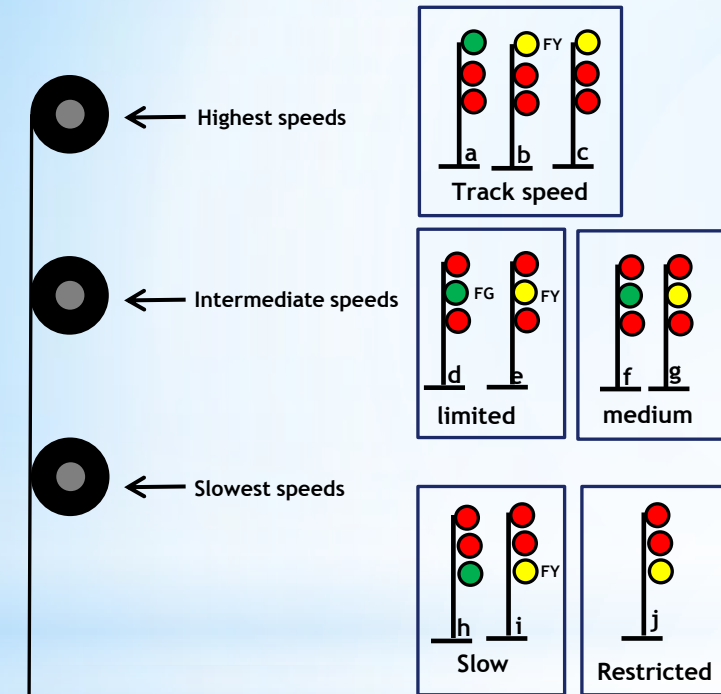
From: \ To:	Clear	Limited	Medium	Slow	Stop	Other
Clear		FG		Anomaly		Stop
Limited	FG				FY	Stop and Proceed at restricted speed
Medium						FY Advanced clear to Stop
Slow					FY	Restricting

Simple Rules to Learn the Meaning of Aspects

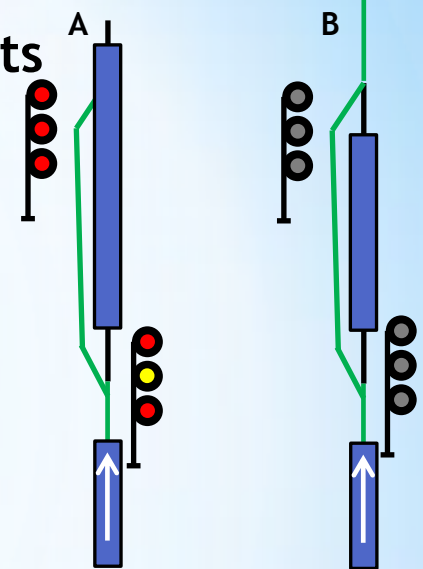
RECALL:

Single Colour Speed Indications

Indication (left to right)



- a) Clear
- b) Advanced Clear to Stop
- c) Clear to Stop
- d) Limited to clear
- e) Limited to stop
- f) Medium to clear
- g) Medium to stop
- h) Slow to clear
- i) Slow to stop
- j) Restricting



A) These aspects indicate the train will take the diverging route at this signal and then have a clear or stop signal.

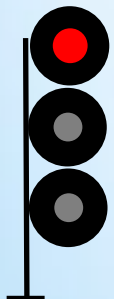
B) But what if the train has to take a diverging route at the next signal?

Can an aspect indicate a diverging route at the current signal and a diverging route at the next signal ?

Rule 5: If there are **TWO** coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

Possibilities are: "limited, medium or slow to limited, medium or slow"

Represented by:



Where  is:  FG,  and/or  FY

Speeds: Limited Medium Slow



← Indicates speed at this signal

← Indicates speed at next signal

Simple Rules to Learn the Meaning of Aspects

Rule 5: If there are **TWO** coloured lights and they are not (RED), then the meaning is "_____ to _____".

Possibilities are: "limited, medium or slow to limited, me"

Meaning: Proceed, *** speed passing signal and through turnouts, approach next signal at @@@ speed)

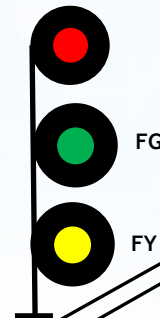
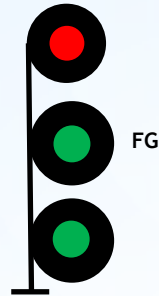
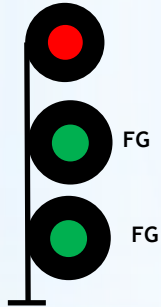
@@@

Limited

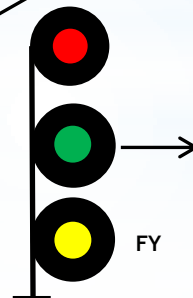
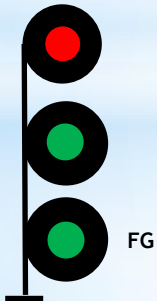
Medium

Slow

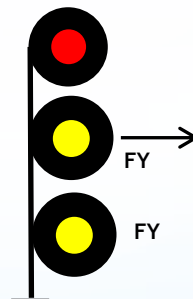
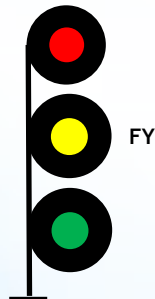
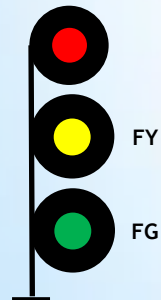
Limited



Medium

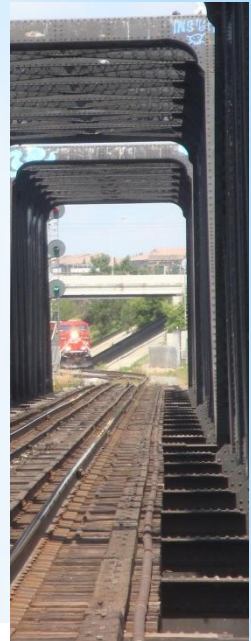


Slow



(RED), then

Looking north across Bow River: Medium to Medium



Mewatta



8th St SE & 9th Ave SE

From: \ To:	Clear	Limited	Medium	Slow	Stop	Other
Clear		FG		FY Anomaly		Stop
Limited	FG	FG FG	FG	FG FY	FY	Stop and Proceed at restricted speed
Medium		FG		FY		FY Advanced clear to Stop
Slow		FY FG	FY	FY FY	FY	Restricting

Summary of Rules for Tall Signals

3-Headed Signals

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED** = **STOP**)

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop";

Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";

Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear";

Rule 4: If you have two coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____";

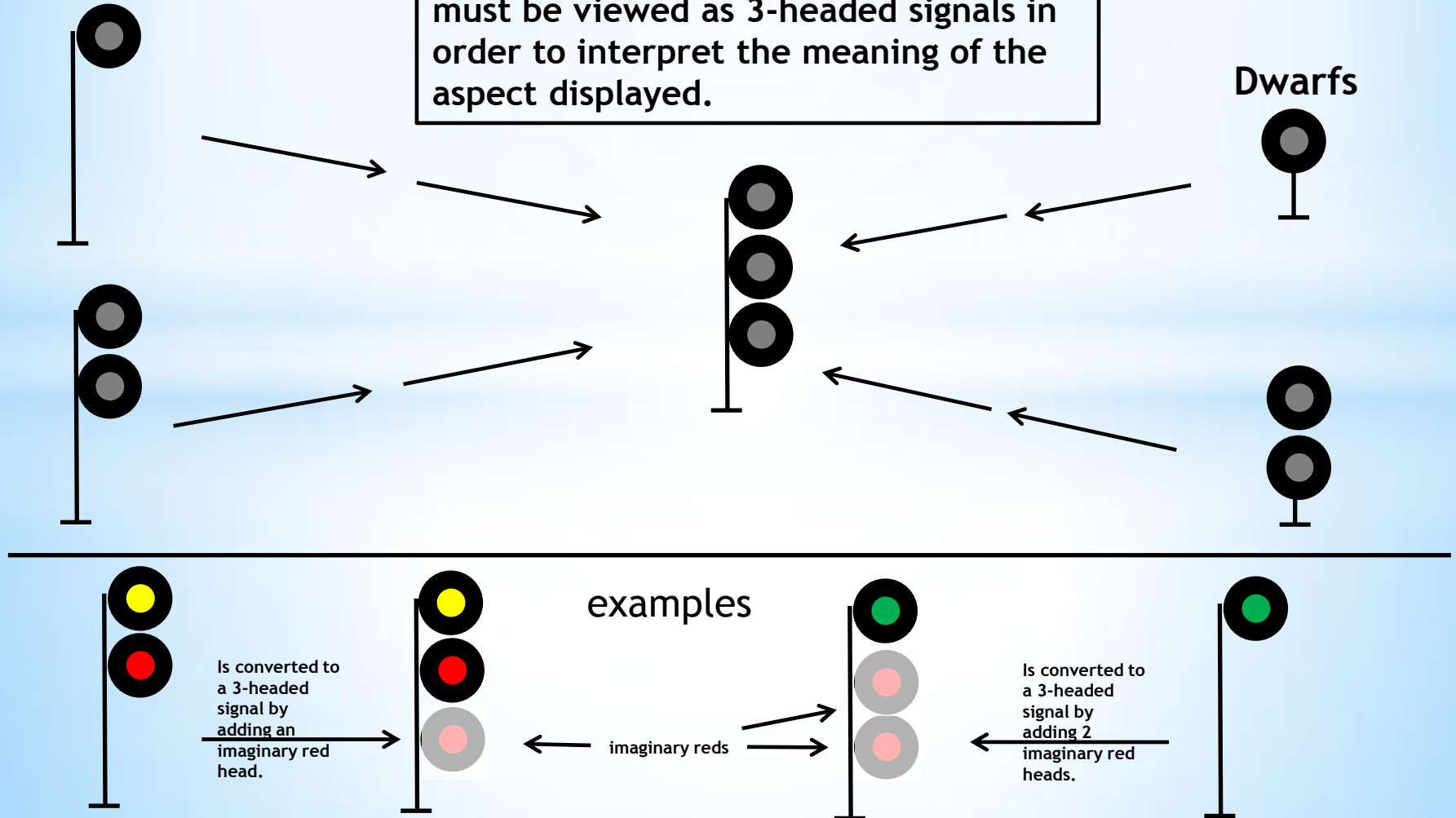
Rule 5: If there are two coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

3-Headed Signals are the Foundation for Interpreting all signals!!

Standard sized signals

1- and 2- headed signals and dwarfs must be viewed as 3-headed signals in order to interpret the meaning of the aspect displayed.

Dwarfs

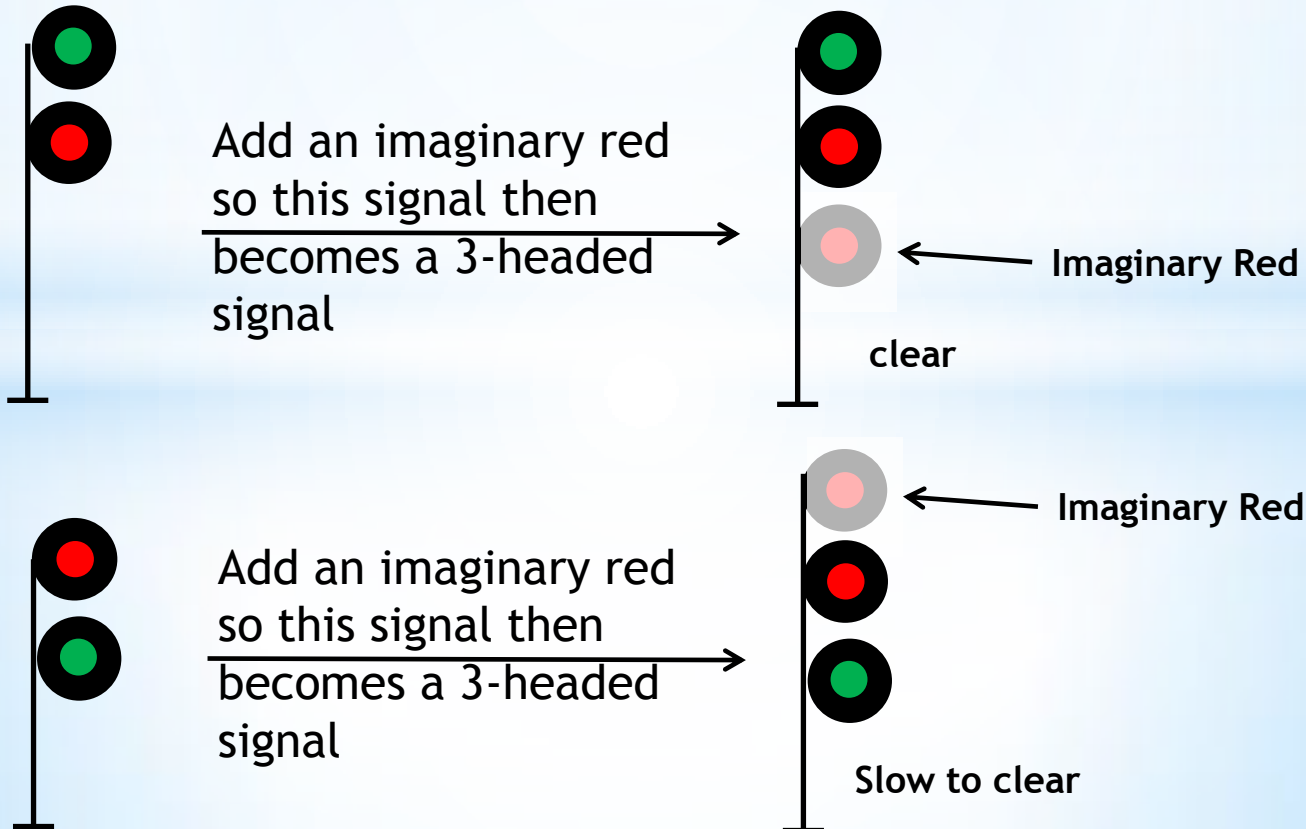


Summary of Rules to Learn the Meaning of Aspects

Rule 6: If there are only 2 heads on a signal, then an 'imaginary red' (IR) head is added as follows:

a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red'.

Adding Imaginary Red Heads

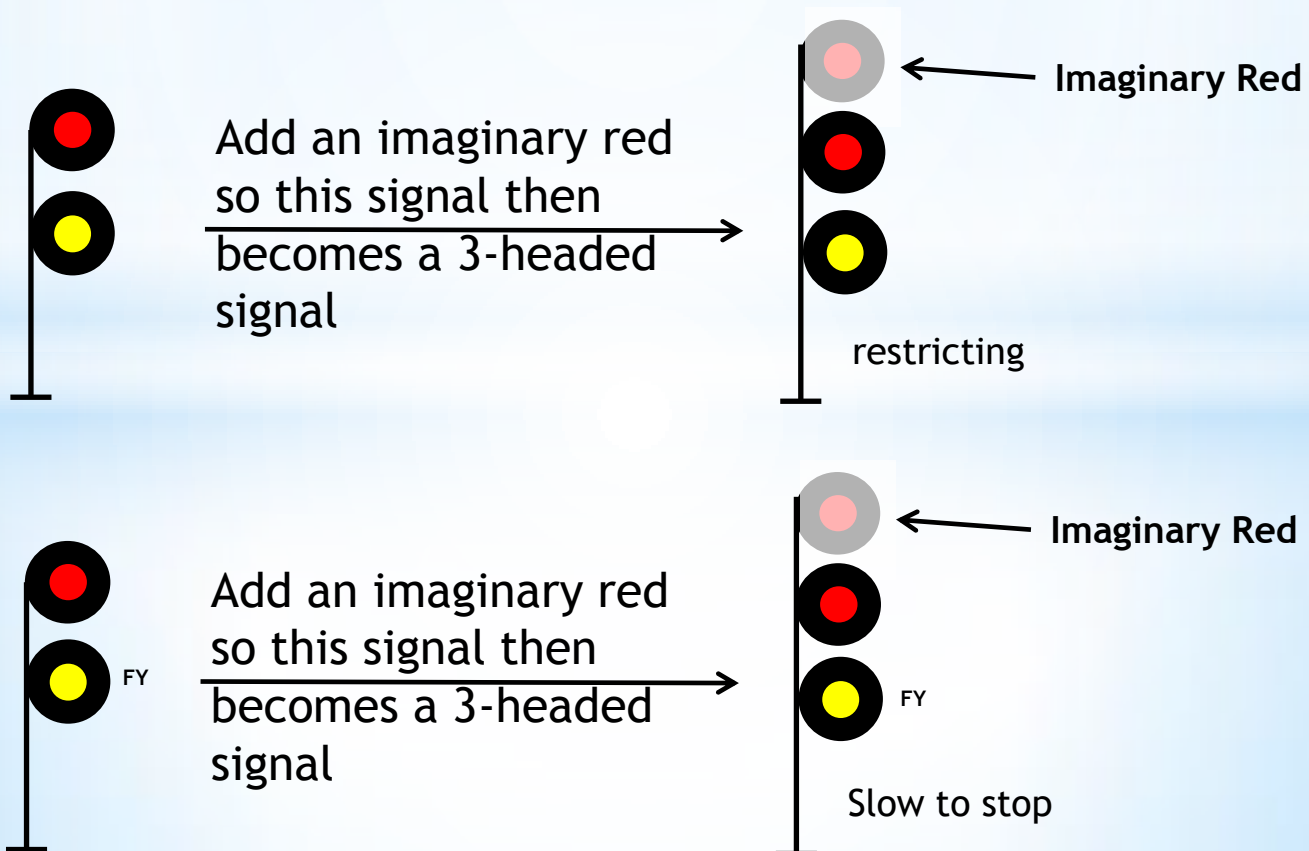


Summary of Rules to Learn the Meaning of Aspects

Rule: If there are only 2 heads on a signal, then an 'imaginary red' (IR) head is added as follows:

a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red'.

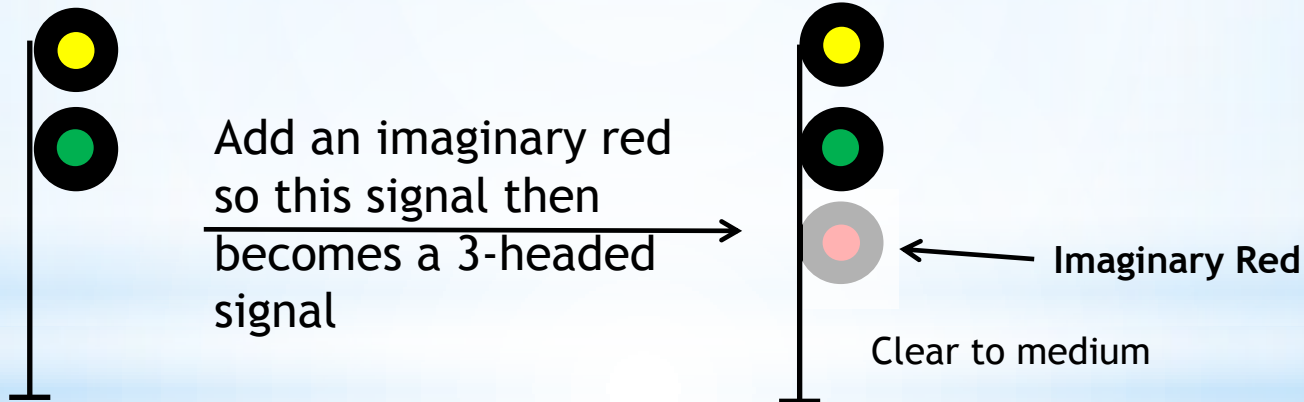
Adding Imaginary Red Heads



Summary of Rules to Learn the Meaning of Aspects

Rule: If there are only 2 heads on a signal, then an 'imaginary red' (IR) head is added as follows:

- a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red'.
- b) if neither of the two heads is 'red', add the 'imaginary red' to the bottom of the existing 2 heads.



Summary of Rules for Signals

3-Headed Signals

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED** = **STOP**)

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop";

Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";

Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear";

Rule 4: If you have two coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____";

Rule 5: If there are two coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

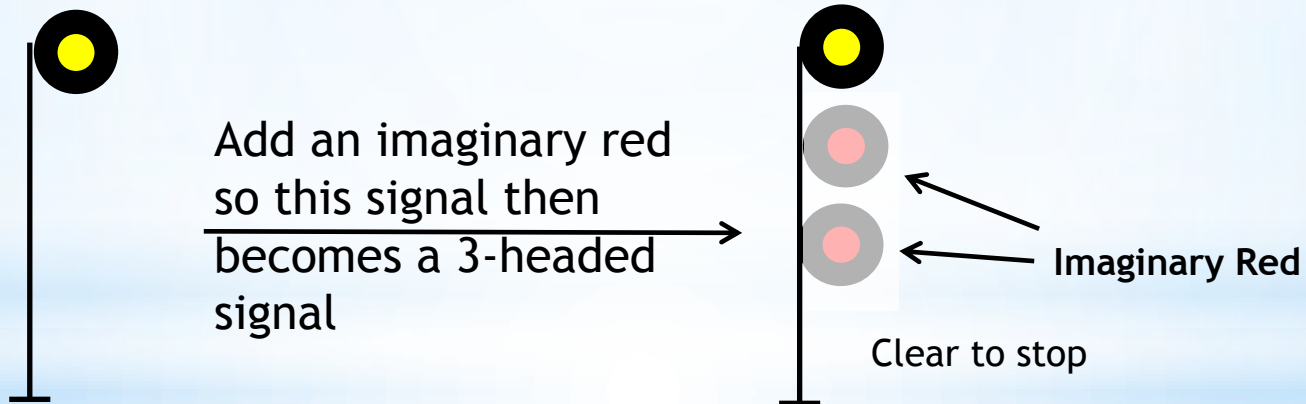
2-Headed Signals (adding imaginary red heads)

If there are only 2 heads on a signal, then an 'imaginary red' (IR) aspect is added as follows:

- a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red';
- b) if neither of the two heads is 'red', add the 'imaginary red' to the bottom of the existing 2 aspects

Summary of Rules to Learn the Meaning of Aspects

Rule: If there is only one head on a signal, add two 'imaginary red' (IR) heads below the existing head.



Summary of Rules for Signals

3-Headed Signals

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED** = **STOP**)

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop";

Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";

Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear";

Rule 4: If you have two coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____";

Rule 5: If there are two coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

2-Headed Signals (adding imaginary red heads)

If there are only 2 heads on a signal, then an 'imaginary red' (IR) aspect is added as follows:

- a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red';
- b) if neither of the two heads is 'red', add the 'imaginary red' to the bottom of the existing 2 aspects

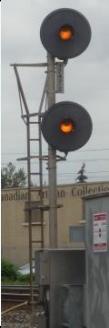
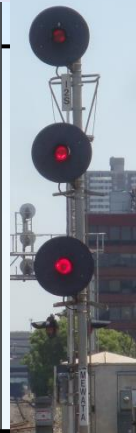
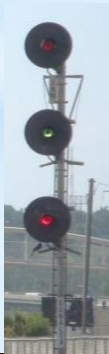
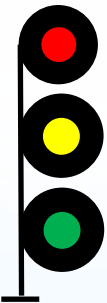
1-Headed Signals (adding imaginary red heads)

If there is only one head on a signal, add 2 'imaginary red' (IR) heads below the existing head

So now the summary sheet looks like this.....

From: \ To:	Clear	Limited	Medium	Slow	Stop	Other
Clear						
Limited						
Medium						
Slow						

As far as I know Limited and Advanced Clear to Stop signals are not seen in Calgary

From: \ To:	Clear	Limited	Medium	Slow	Stop	
Clear						
Limited						
Medium				 FY		
Slow			 FY	 FY FY		

Let's Try Some Examples

1-Headed Signals (adding imaginary red heads)

If there is only one head on a signal, add 2 'imaginary red' (IR) heads below the existing head

2-Headed Signals (adding imaginary red heads)

If there are only 2 heads on a signal, then an 'imaginary red' (IR) aspect is added as follows:

- a) If one of the two heads is 'red', add the 'imaginary red' (IR) above (if the 'red' is on top) or below (if the 'red' is on bottom) the existing 'red';
- b) if neither of the two heads is 'red', add the 'imaginary red' to the bottom of the existing 2 aspects

3-Headed Signals

Rule 1: If the signal is not **ALL RED**, it is not red at all; (**ALL RED = STOP**)

Rule 2a: If there is only one coloured light and it's **YELLOW**, then the indication is: "_____ to stop";

Rule 2b: If you have a **SOLID YELLOW** on the bottom and no other colours, then the meaning is "Restricting";

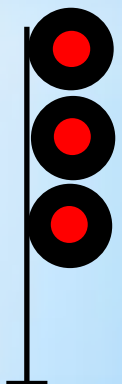
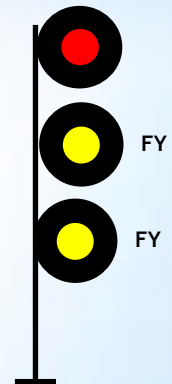
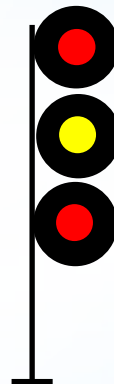
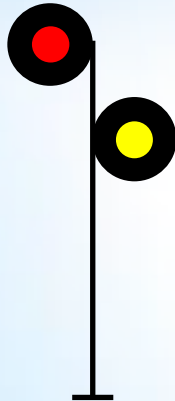
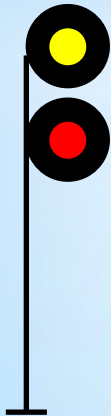
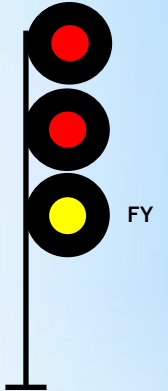
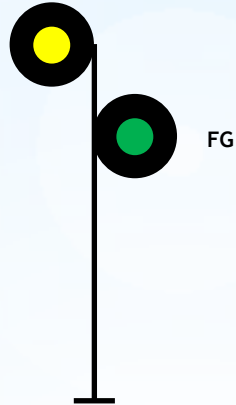
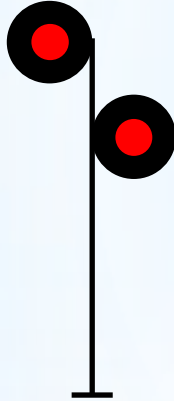
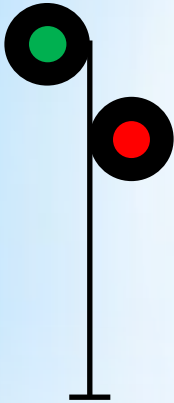
Rule 3: If there is only one coloured light and it's **GREEN**, then the meaning is: "_____ to clear";

Rule 4: If you have two coloured lights and the top light is **SOLID YELLOW**, then the meaning is "clear to _____";

Rule 5: If there are two coloured lights and they are not on top (i.e. top is **RED**), then the meaning is "_____ to _____".

Practice makes perfect.

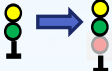
What is the meaning of the following signals?

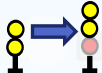


Dwarf Signals Summary of Rules for Dwarf Signals

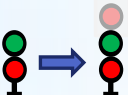
a) Two Headed Dwarf Signal

i) G/G - clear 

ii) Y/G - add imaginary red head to bottom:  Clear to Medium

iii) Y/Y - add imaginary red head to bottom:  Clear to Slow

iv) all other combinations, add imaginary red head to the top of the dwarf signal, Examples:

G/R  Medium to Clear

R/G  Slow to Clear

R/FY  Slow to Stop

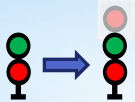
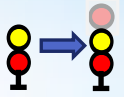
b) Single Head Dwarf Signal

i) always place 2 imaginary red heads on top of the existing head,

G  Slow to Clear

FY  Slow to Stop

Summary of Dwarf Signals with Imaginary Reds

From: \ To:	Clear		Medium	Slow	Stop	Other
Clear						  
						
Medium						
Slow	 				 	 
						Restricting

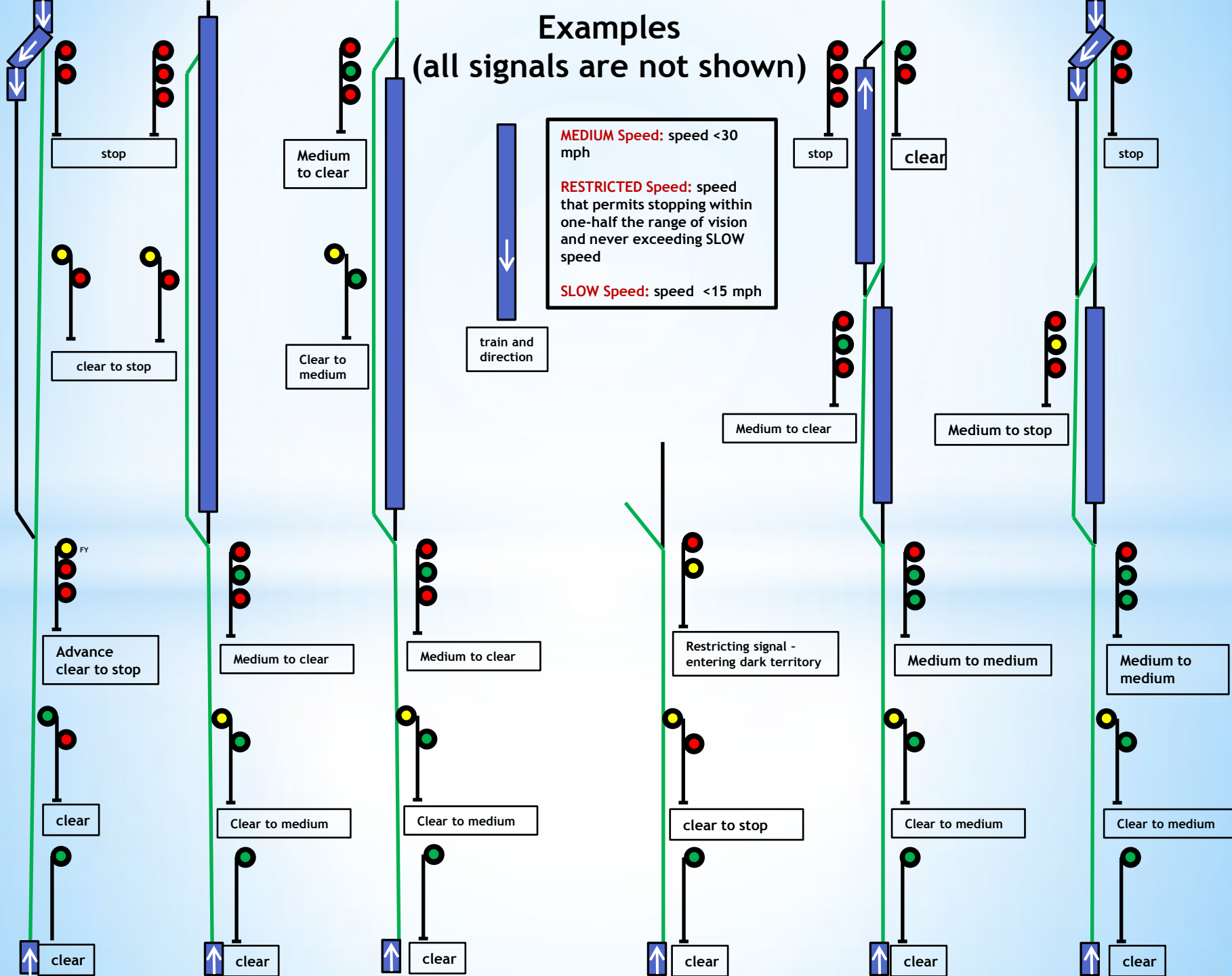
Examples (all signals are not shown)

MEDIUM Speed: speed <30 mph

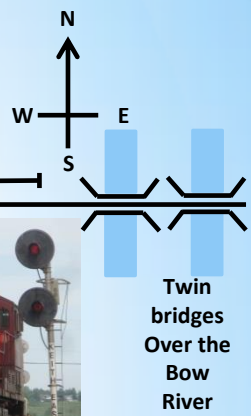
RESTRICTED Speed: speed that permits stopping within one-half the range of vision and never exceeding SLOW speed

SLOW Speed: speed <15 mph

train and direction



Signals on Laggan Sub from Bearspaw to 8th St SE



Bearspaw (7376')

Intermediate
signals

Keith (8945')

Dark territory – track doesn't
show on RTC board.

32 Ave NW

Intermediate
signals

11 St SW

Sunalta

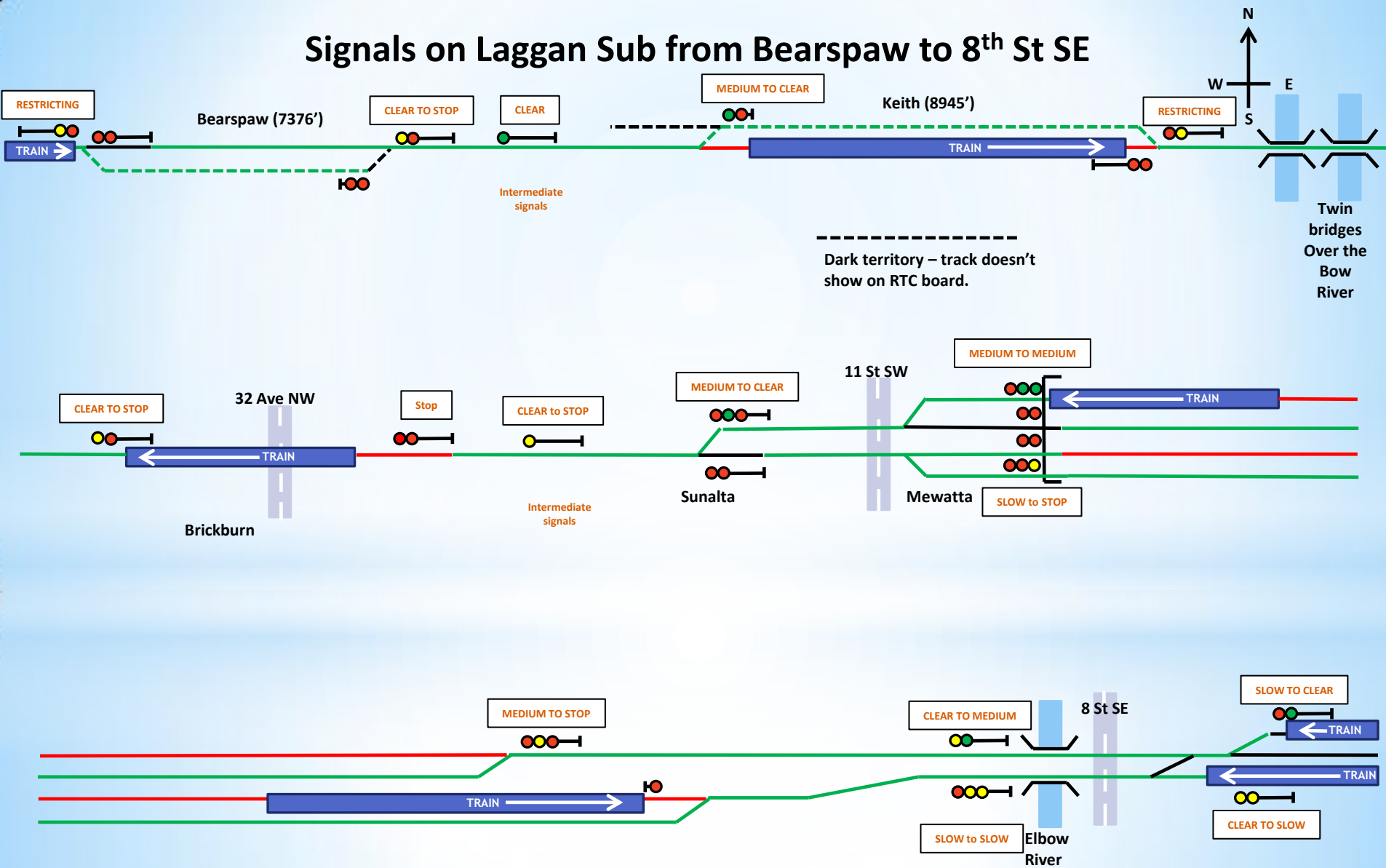
Mewatta

Brickburn (6888')

8 St SE

Elbow
River

Signals on Laggan Sub from Bearspaw to 8th St SE



Questions?



Intermediate to
Bears paw East



Sunalta



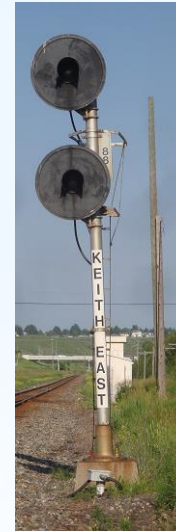
Keith East



Bengal



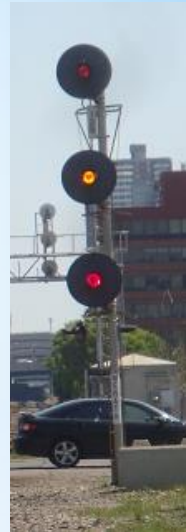
Sunalta



Keith East



8th St. SE &
9th Ave. SE



Mewatta

NOW I KNOW WHAT
THESE SIGNALS
MEAN?

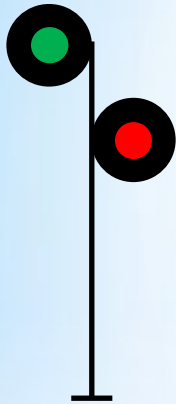
IT'S NOT THAT
DIFFICULT!

YAHOO!

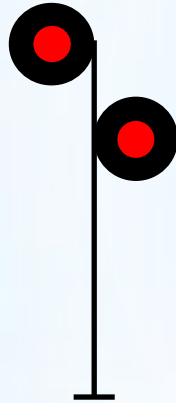


Practice makes perfect.

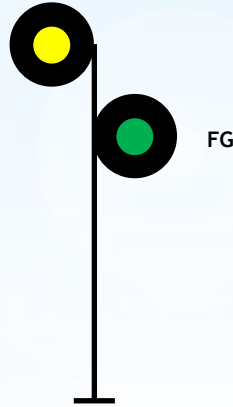
What is the meaning of the following signals?



Clear



Stop and proceed
at restricted speed



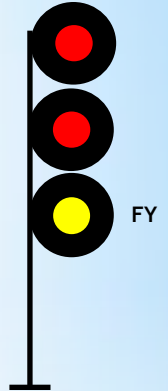
Clear to Limited



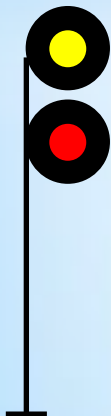
Medium to Medium



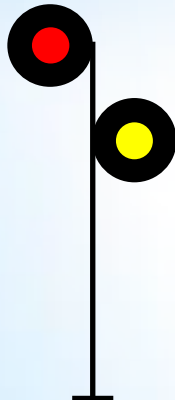
Stop and proceed
at restricted speed



Slow to Stop



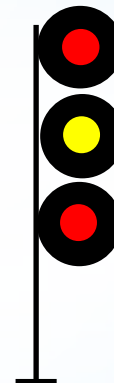
Clear to stop



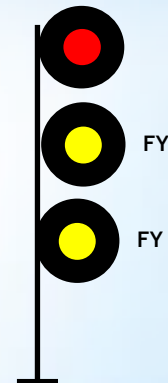
Restricting



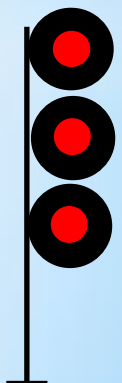
Clear to Medium



Medium to Stop



Slow to Slow



Stop