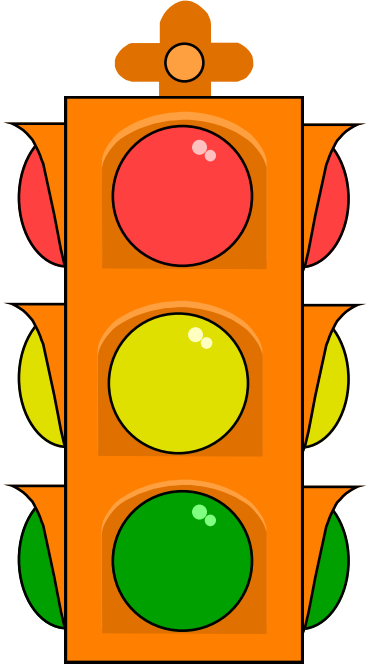
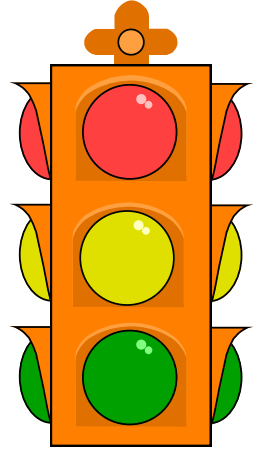




Traffic Engineering

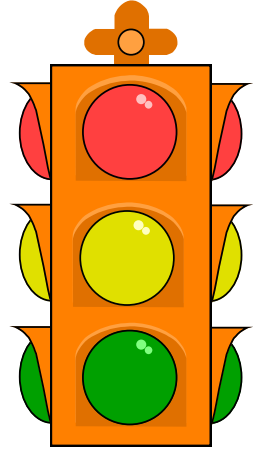
Traffic Control Devices

Traffic Control



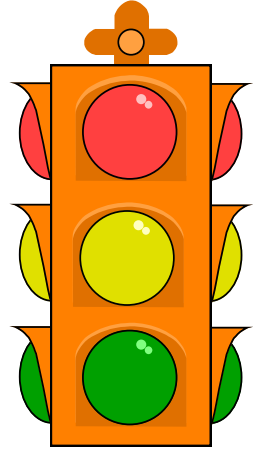
- Traffic engineers do not have any control over individual drivers
- need to develop devices which communicate uncomplicated messages that encourage proper compliance

MUTCD



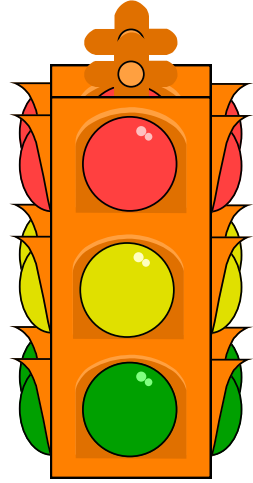
- Manual Of Uniform Traffic Control Devices (MUTCD)
- principal standard governing use, placement, design of traffic control devices
- establish uniformity

MUTCD



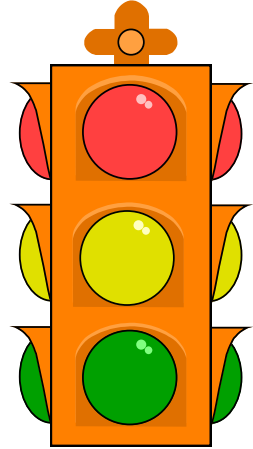
- General Principles
- 1) Fulfill a need - NO unnecessary sign or devices
- 2) Command attention
- 3) Convey a clear, simple meaning
- 4) Command respect of road users
- 5) Give adequate time for proper response

MUTCD



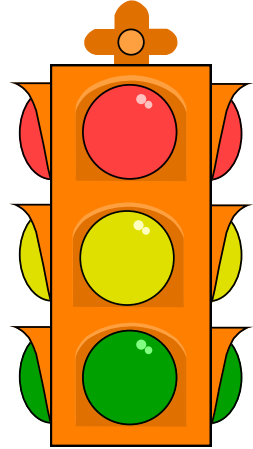
- Contents
- Standards for design of device (size, shape, color, legend types, specific legend)
- Standards for placement of devices
- Warrants which justify a device

MUTCD



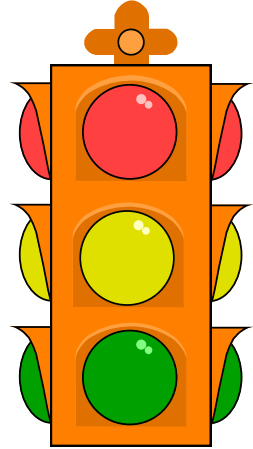
- 3 words
- Shall - mandatory condition
- Should - advisory - if not placed according to standards need clear reason why not
- May - permissive - no design or application requirements

Communicating with drivers



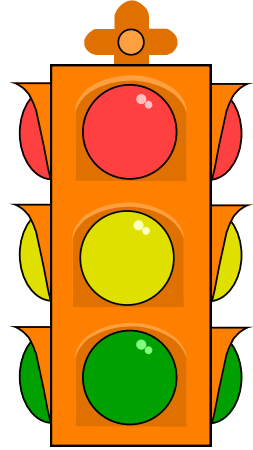
- Use Color, Pattern, Shape, Legend
- Redundancy is good
 - STOP sign 1- RED 2- Octagon 3- STOP
 - Figure 4-1

Longitudinal Markings



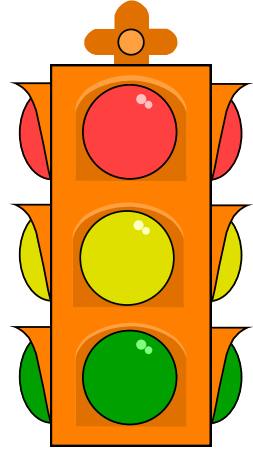
- Striping on the roadway
 - Centerlines
 - Lane markings
 - Edge marking
 - Figure 4.2

Transverse Markings (across roadway)



- Stop lines - line behind which vehicle must stop
- Crosswalks
 - Figure 4.3
- Parking space markings
 - Figure 4.4

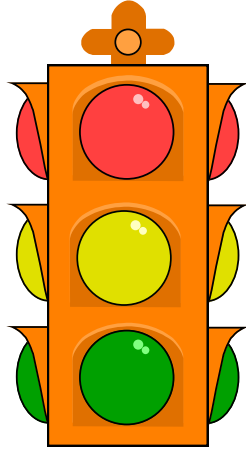
Word & Symbol marking



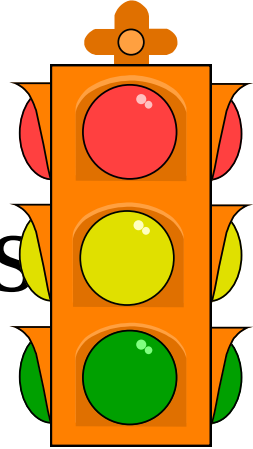
- A sign is placed as well to ensure that drivers can see one of the devices in all weather conditions
- Lane use restrictions
 - Exit only, right turn only
- School

Intersection markings

- Want to provide a safe and orderly flow through the intersection

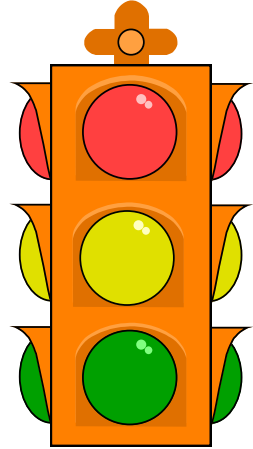


Object Markers and delineators



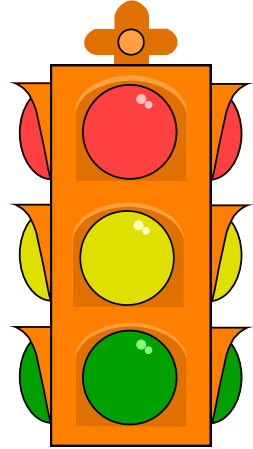
- placed on object adjacent to or within roadway
- also mark edge of road
- Figure 4.5

Traffic signs



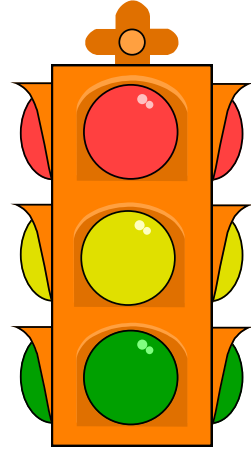
- Regulatory - black legend on white
 - ROW series (includes STOP & Yield)
 - Speed Series
 - Movement Series
 - (turn signs, Alignment signs, Exclusion signs, One - way signs)
 - Parking Series
 - (Parking, standing, Stopping)
 - Pedestrian Series Figure
 - Misc. Series - signs that do not fit in other series

Traffic Signs



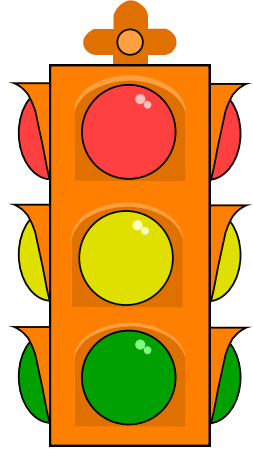
- Warning -
 - black legend on yellow - diamond shaped
 - Warn drivers of impending conditions
 - 11 conditions which may require warning signs – pg 88
 - Must be placed significantly ahead of condition so that driver can go through P/R
 - Figure 4.12
- Advisory speed Panel
 - when there is a drop in speed limit through a section

3 basic conditions - Table 4-1



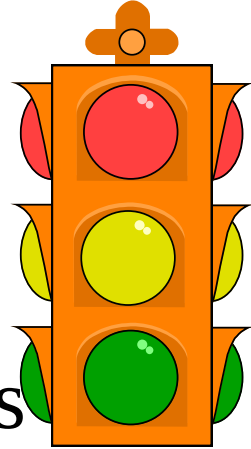
- Condition A - difficult judgments assume 10 seconds
- Condition B - may require driver to come to a full stop 3 seconds
- Condition C - require driver to slow to an advisory speed 3 seconds

Traffic Signs



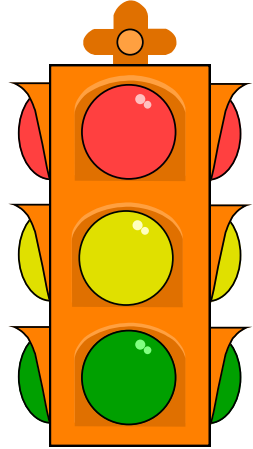
- Guide - white legend on green, blue or brown background
 - Provide drivers with information to choose appropriate routes
 - General principles page 89
 - Route markers - show route (Jurisdiction & number) Figure 4.13

Traffic Signs



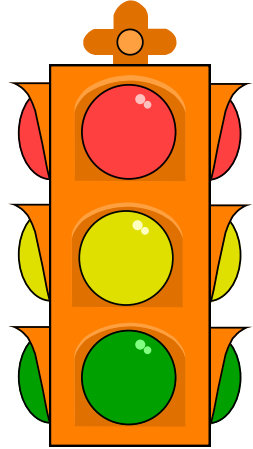
- Destination signs - conventional roadways
 - Destination signs - Expressway & freeway
- Figure 4-14, 15
- Destinations in initial capital and small letters
 - Numbered routes included
 - Exit numbers on auxiliary panel in upper left or right corner (indicates exit location)
 - At major interchanges diagrams used

Traffic Signs



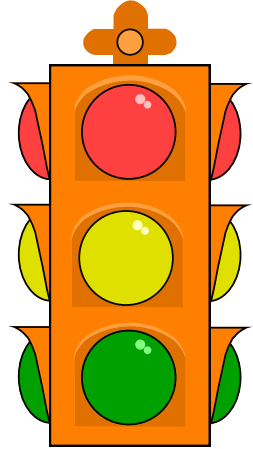
- Service guide signs Figure 4.16
 - White on Blue show services available at rest area or off exit
- Recreational & Cultural interest Figure 4.17
 - White on Brown
- Mileposts
 - White on green gives mileage from beginning of road (either south or west)

Traffic Signals



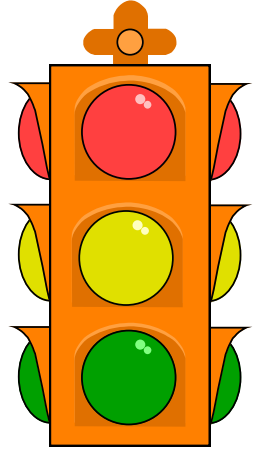
- “any power operated traffic control device other than a barricade warning light or steady burning electric lamp, by which traffic is warned or directed to take some specific action”
- Traffic signals must be warranted
 - 11 warrants to place signal – page 455
 - to remove a signal must not be able to meet

Traffic Signals



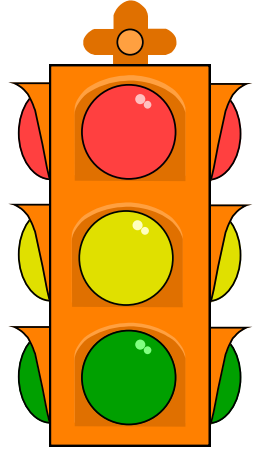
- Benefits - page 453
- Disadvantages – page 454
- Steady Circular Indications
- Green, Yellow, or Red Ball
- Right turns can stop, look , go
- Left turns entering a one way street may stop, look, go

Traffic Signals



- Flashing Circular Indications
- Yellow or Red
 - Stop and proceed with caution
- Steady Arrow
- Green, Yellow and Red arrows
 - same meaning as balls but now are direction specific

Traffic Signals



- 2 lens sizes
- 12” and 8”
- usually use 12” red with 8” yellow and green
- 12” is required for conditions on page 98
- Signal face design
 - Figure 4.18