

TO: All HQ Directors: Operations, Planning & Major Projects
All Regional Directors
All District Managers Transportation
Manager, Provincial Sign Shop

Subject: Guidelines for the Operation of Changeable Message Signs (CMSs) and Portable Changeable Message Signs (PCMSs)

Purpose:

To amend the British Columbia Ministry of Transportation's *Policy on Messages for Changeable Message Signs*, June 1995.

Background:

Permanent/Stationary Changeable Message Signs (CMS) and Portable Changeable Message Signs (PCMS) are part of the BCMoT's Traffic Management System. The purpose of these devices is to display words, numbers or symbols which can be changed on demand to communicate real-time roadway, traffic, or traveller information to road users, as conditions warrant. The advance communication of information to road users allows them to react to conditions in a safe and timely manner. CMSs and PCMSs also provide the opportunity to display Public Service Announcements and Public Safety Messages to road users.

Policy:

The attached policy *Guidelines For The Operation Of Changeable Message Signs (CMSs) And Portable Changeable Message Signs (PCMSs)* provides specific guidelines for the operational use of CMSs and PCMSs used on the British Columbia Highway system. These guidelines ensure that messages displayed shall convey pertinent information to road users, and the design and location of these devices follow procedures that provide correct and consistent field deployments.

Attachment – BC MoT Guidelines for the Operation of Changeable Message Signs (CMSS) and Portable Changeable Message Signs (PCMS)

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BC MOT GUIDELINES FOR THE
OPERATION OF
CHANGEABLE MESSAGE SIGNS (CMSs)
AND
PORTABLE CHANGEABLE MESSAGE SIGNS (PCMSs)

British Columbia Ministry of Transportation

Engineering Branch

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SECTION I: CHANGEABLE MESSAGE SIGNS (CMS)

1.0 General

Changeable message signs (CMS), variable message signs (VMS) and dynamic message signs (DMS) are synonymous terms referring to permanent signs on MoT roads that electronically display travel and road condition information to road users. Control of CMS signs is coordinated through the Provincial Highway Conditions Centre (PHCC) 604.660.9770 in Burnaby BC.

There are two types of electronic message signs used on provincial roads: CMSs and open/closed signs. CMSs display the pre-programmed road user messages while open/closed signs only display an electronic “OPEN” or “CLOSED” message on a static sign to indicate the status of the road.

2.0 CMS Placement Guidelines

CMS placement will be site specific. Generally they should be placed to ensure maximum visibility and located in areas of minimal visual clutter. CMS signs should be visible at a distance of 1km and should not be placed in sag curves or beyond a crest curve. Consideration should be given to the CMS placement with respect to the sun. In the spring and fall, the low sun position can severely affect the sign visibility. Sign and site design details should be developed prior to field installation of a CMS. For locations requiring detailed complex messages more than one CMS may be required.

The presence of a CMS implies a possible change in upcoming travel conditions. Section 4.0 outlines the guidelines that should be followed in message design.

3.0 CMS Equipment Guidelines

- 3.1 Minimum character sizes:
 - 3.1.1 450mm (18”) when used in zones where the speed limit is 70km/h, or higher. (275m viewing distance).
 - 3.1.2 250mm (12”) for urban areas ≤60km/h providing the messaged can be read twice at the travel speed. (150m viewing distance).
- 3.2 CMS should automatically adjust brightness of the display relative to ambient light conditions to maintain visibility.

- 3.3 The characters displayed on a CMS should be yellow, orange or green using a light illuminating source against a black background. Messages in red should be limited to stop situations such as “STOP AHEAD.” Messages using white LEDs should be restricted to regulatory messages. This policy does not preclude the use of new technologies that may emerge and prove effective for displaying characters other than what is mentioned above.

4.0 CMS Display Message Guidelines

- 4.1 Approximately 1 second is required for a road user to read 1 word or 1.5 to 2.0 seconds per phrase. CMS messages should convey a single thought and sequenced in the following hierarchy;

- 4.1.1 WHAT the event is. [e.g. Avalanche].
- 4.1.2 WHEN it occurred or WHAT the result is. [e.g. Road Closed].
- 4.1.3 HOW the road user is required to respond. [e.g. Detour via Hwy 3] This part may be optional depending on the nature of the message.

Words such as “WARNING,” “CAUTION,” or “EXTREME” should not be used if these words sacrifice better information.

- 4.2 The number of characters and lines required on a CMS will vary depending on length and complexity of the message required and may require a custom sign. Generally MoT message boards have a minimum of 2 lines with 22 characters per line, resulting in a message size of 44 characters. Messages are displayed in 2 phases and cycled so the road user can read the messages twice at travel speed. Each phase represents a unit of information. See the example in Section 4.5.
- 4.3 If there are no road conditions or information to report to road users, the CMS should display the following messages¹:

¹ Some CMS's may eventually be equipped with clocks and/or weather stations allowing for the display of Date, Time, and Temperature.

- 4.3.1 During winter months, if there are no incidents or road works the CMS may display the road condition. For example, if the road surface is known to be completely clear then the term “BARE” could be used. An ICBC or RCMP/Local police public service message may also be displayed on alternating phases.
- 4.3.2 During summer months, if there are no incidents to report then forest fire hazard messages followed by ICBC or RCMP/Local police public service messages may be displayed. CMSs may also be used as part of an optional “**Advance Information Zone**” for road works taking place on MoT roadways in the regional area. The CMS will notify road users of the activity from several kilometers to several hundred kilometers in advance of the work zone. The CMS should advise road users of location, type, and times of work activity. Contact the Provincial Highway Conditions Centre (PHCC), at 604.660.9770 for CMS sign locations and message programming.
- 4.4 The CMS message should use full words whenever possible, however abbreviations may be required to fit long messages on the sign. When abbreviations are used they should be limited to commonly known ones as shown in the Table 1 below:

Table 1

Word	Abbr.	Word	Abbrev.
Ahead	AHD	Maintenance	MAINT
Alternating/Alternate	ALT	Motor Vehicle	MV
Boulevard	BLVD	Prepare	PREP
Bridge	BRDG	Pavement	PVMT
Cardinal Dir.	N, E, W, S	Parking	PKING
Construction	CONST	Required	REQ'D
Emergency	EMER	Route	RTE
Exit	EXT	Road	RD
Entrance	ENT	Right	RT
Freeway	FWY	Shoulder	SHLDR
Hazardous	HAZ	Slippery	SLIP
Highway	HWY	Speed	SPD
Information	INFO	Summit	SMT
Junction	JCT	Traffic	TRAF
Kilometre	KM	Warning	WARN
Lane	LN	Vehicle	VEH
Left	LFT		
Minutes	MIN		
Minor	MNR		

- 4.5 A long message may require 4 lines of text displayed in two phases. The message should be able to be read by the road user twice before passing the CMS while traveling at the speed limit. For locations where more than one CMS is used and visible to road users, only one sign shall display a sequential message at any given time. Refer to the following example:

Cycle 1:



Cycle 2:



Example:

- Speed Limit = 90 km/h = 25 m/s
- View time per Phrase or per individual line = 3 seconds per phrase/line displayed
- View time for 2 Phrases or 2 individual line displays = 2 phrases (X) 3 sec. = 6 sec view time per phase
- 2 Phases per cycle = 2 phases (X) 6 sec per phase = 12 sec per cycle
- 2 cycles of the display must be seen by road users before they pass under the sign. Therefore, 2 cycles (X) 12 seconds per cycle = 24 seconds to display two complete cycles of the message.
- Therefore for a 90 km/h (25 m/s) posted speed the sign must be visible for a minimum of 600 metres.
600 metres = 24 sec X 25 m/s

4.6 Messages Unique to Geographical Area

MoT Regional and District offices may develop incident specific message plans which identify unique situations or incidences relevant to a particular geographical area where the general messages in this policy may not be adequate. These messages would typically be used on specific CMSs under certain conditions. For instance, several CMS signs may be utilized as a Regional corridor wide traffic management strategy to facilitate response to incidents and help mitigate traffic congestion. For example, if Highway 1 were closed Highway 5 could be signed as the alternate route for access between the interior of BC and lower mainland.

4.7 Message Familiarity

Message familiarity is a major factor in the ability for a road user to understand a message. When information displayed to road users is lengthy or unusual, longer comprehension time is required. Brief and common language is necessary on CMS signs.

5.0 Message Categories Table 2 (This is not an exhaustive list and other categories may be added)

Table 2

Incidents	Planned Events	Road / Climatic Conditions	Public Service Message
Avalanche	Avalanche Control	Bare	<u>ICBC Road Safety</u>
Bridge Wash Out	Bridge	Bare & Dry	ICBC and RCMP/Local
Blowing Snow	Construction	Bare & Wet	police messages
Collision	Bridge	Black Ice	"It's Back To School"
Debris on Road	Maintenance	Blowing Snow	"Slow in School Zones"
Dust Storm	Construction	Compact Ice	See appendix
Forest Fire	Garbage Pickup	Compact Snow	
Freeze Level X000m	Line Painting	Compact Snow /Chains Required	<u>Forest Fire Prevention/Risk</u>
High Winds	Paint Crew	Compact Snow /Plowing & Sanding	
Hazardous Material Spill	Mowing	Compact Snow/ Slippery	"Extreme Fire Hazard
Hydro Lines Down	Night Work	Sections	Kootenays"
Livestock on Road	Paving Operations	Compact Snow Sanded	"Extreme Fire Danger Local
Material Spill	Road Construction	Falling Ice	Bans In Effect"
Vehicle Crash	Road Maintenance	Falling Rock	"Campfire Ban"
Mud Slide	Road Sweeping	Flooded	
Police Incident	Roadside Brushing	Freezing Rain	<u>Provincial Emergency</u>
Rock Slide	Rock Scaling	Frost Heaves	<u>Program (PEP)</u>
Traffic Signal Failure	Seal Coating	Heavy Snowfall	"Tsunami Warning"
Snow at Higher Elevations	Special Event	Caution - Reduce Speed - Snow	Queen Charlotte Is.
	Tree Pruning	Heavy Snowfall / Plowing & Sanding	Wed Nov 16 10pm–2am
	Traffic Signal Out	High Avalanche Hazard	
Vehicle Fire	Travel Advisory	Limited Visibility Blowing Snow	<u>Ministry of the Environment</u>
Vehicle Stall	Utility Works	Limited Visibility/ Dense Fog	
Wash Out		Limited Visibility Heavy Snowfall	"Report Poachers and
Wildlife on Road		Limited Visibility Smoke	Polluters"
■ Big Horn	<u>Location</u>	Plowing & Sanding In Progress	Call 24/7 1-877-952-7277
■ Sheep	<u>Descriptors:</u>	Slippery Sections	
■ Elk	HWY X Closed	Slushy Sections	<u>Worksafe BC (WCB)</u>
■ Caribou	Exit XX Closed	Smoke	Worker Safety Campaign
	Use Hwy XX	Traffic Congestion	Messaging.
	XXX Ahead	Trucks Chains Required	
	Ahead	All Vehicles Chains Required	<u>Commercial Vehicle Safety</u>
	Single Lane Traffic	All Vehicles Must Use Chains Or	<u>Enforcement (CVSE)</u>
	Single Lane	Snow Tires	"Tire chain laws in effect
	Alternating	Water Ponding	October 1 to April 30."
	Right Lane Closed		
	Ahead		
	Left Lane Closed		
	Centre Lane		
	Closed		
	One Lane Bridge		
	Mon – Fri		
	XAM – YPM		
	NEXT <u>XXX</u> km		

6.0 Message Priorities

CMS messages shall be displayed based on potential severity of risk to the road user, therefore the message priority should be:

6.1 Amber Alerts, Public Emergencies/ Safety Broadcasts

These are rare but significant events that require immediate communication to road users. Public emergencies and safety broadcast can include, disaster response information, tsunami warnings, terrorism events or alerts. This information will be communicated to the PHCC from the Provincial Emergency centre.

6.2 Incidents and Road Conditions, Samples include:

6.2.1 Crashes

6.2.2 Traffic Diversion – Lane, Road, or Mountain Pass Closed due to Weather

6.2.3 Adverse Weather Conditions

6.3 Planned Events and Traffic Management, Samples include:

6.3.1 Notice of Road Construction Projects

6.3.2 Notice of Future Road Work

6.4 Public Service Messages, Samples include:

6.4.1 Fire Danger

6.4.2 Driver Safety Campaigns

6.5 “Good” road conditions, i.e. no operational incidents, normal conditions.

7.0 Sample CMS Messages

HWY 5 & 97C
BARE & DRY

HWY 3 CLOSED DUE TO
AVALANCHE - USE HWY 5

BRIDGE MAINT 12KM
LEFT LANE CLOSED

FLAG PERSON 3KM
PREPARE TO STOP

VEHICLE CRASH AHEAD
DETOUR EXT 123

ROGERS PASS
CHAINS REQUIRED

WATCH FOR WILDLIFE
ON ROAD AHEAD

LINE PAINTING AHEAD
9AM - 3PM DAILY

BRIDGE WASHOUT 12KM
1 LANE ALT TRAFFIC

FOREST FIRE 30KM
LOW VISIBILTY - SMOKE

EXTREME FIRE HAZARD
CAMPFIRE BAN

BLOWING SNOW NEXT 10KM
LOW VISIBILTY

SLOW DOWN
KEEP YOUR DISTANCE

8.0 Authority

Emergency CMS message displays may be authorized by the MoT District Transportation Manager or delegate. Message displays are controlled by the Provincial Highways Condition Centre in accordance to this policy circular.

The MoT Chief Engineer approves the CMS policy and any revisions to the policy.

9.0 References

Dudek, C.L. *Guidelines for Changeable Message Sign Messages: A White Paper*
Report No. FHWA [Draft] Texas Transportation Institute, College Station, TX December 2002

North Carolina Department of Transportation, *Operational Guidelines for the use of Changeable Message Signs*, Raleigh North Carolina, July 1999

British Columbia Ministry of Transportation *Policy on Messages for Changeable Message Signs*,
June 1995

10.0 Appendix

10.1 Sign Locations (Note: Contact BCMoT Electrical Services (604 660-8298) for information on what contractor provides maintenance on these signs).

Table 3 Changeable Message Signs (CMS):²

Sign #	Hwy #	Place	Location	Hwy Eng Ref
11-1	Hwy 1/99	W. Vancouver	w/b Westmount Interchange	TE-88069
11-2	Hwy 99	Squamish	s/b 11 km south of Valley Drive	TE-88070
11-3	Hwy 99	Alice Lake	n/b 10.24 km north of Squamish	Na
11-4 ³	Hwy 1	W. Vancouver	e/b at 15 th Street W. Vancouver	Na
12-1	Hwy 1	Mill Bay	s/b at Mill Bay (Malahat)	Na
12-2	Hwy 1	Colwood	n/b at Colwood (Malahat)	Na
13-1 ³	Hwy 99	Surrey	Hwy 99 s/b at 16 th Ave., surrey	Na
13-2 ³	Hwy 15	Surrey	Hwy 15 s/b 0.5 km north of 8 th Ave., Surrey	Na
15-1	Hwy 1	Laidlaw	e/b 1.5 km west of Hunter Creek Weigh Scale	TE-85050
15-2	Hwy 3	Laidlaw	Hwy 1 e/b 1 km west of Hunter Creek Weigh Scale	TE-85050
15-3	Hwys 5/97C	Laidlaw	Hwy 1 e/b 500m west of Hunter Creek Weigh Scale	TE-85050
15-5	Hwy 1	Hope	Hwy 7 e/b 1 km west of Haig interchange	TE-88043
15-7	Hwy 5	Coquihalla	Hwy 5 n/b 2 km west of Peerces Creek interchange	TE-84064
15-8	Hwy 97C	Coquihalla	Hwy 5 n/b 3 km west of Jessica interchange	TE-87065
15-9	Hwy 1	Matsqui	1.5 km west of McCallum Rd interchange	TE-91048
15-10	Hwy 1	Abbotsford	1.5 km west of Whatcom Rd interchange	TE-91048
15-11	Hwy 1	Abbotsford	w/b 980m north of No. 3 rd U/P	TE-91048
15-12	Hwy 1	Chilliwack	w/b 1 km east of Lickman Rd interchange	TE-91048
21-1	Hwy 1	Kamloops	Hwy 1 w/b 500m west of Sagebrush interchange	TE-87069
21-2	Hwy 1	Kamloops	1/97 e/b 500m east of Vicars Rd	TE-86028
21-4	Hwys 5/97C	Kamloops	Hwy 1 w/b 500m west of Aberdeen interchange	TE-87069
24-1	Hwy 3	Princeton	w/b 1 km west of Vermillion Ave	na
22-1	Hwy 1	Sicamous	Hwy 1 e/b km east of Rte 97A	TE-86003
25-2	Hwy 5	Coquihalla	s/b 2 km north of Coquihalla Lakes	TE-84067
25-3	Hwy 5	Coquihalla	s/b 3 km north of Kingsvale interchange	TE-84057
25-5	Hwys 5/97C	Merritt	Hwy 5 s/b 4 km north of Nicola interchange	TE-87069
25-9	Hwy 5	Aspen Grove	Hwy 1 w/b 3 km east of Aspen Grove intersection	Na
26-1	Hwy 1	Spences Brg	w/b 1 km north of Hwy 8	Na
29-1	Hwy 97C	Westbank	Hwy 97 w/b 2 km east of HWY 97C Junction	Na
29-2	Hwy 97C	Peachland	Hwy o7 n/b 2 km south of Hwy 97C Junction	Na
31-1	Hwy 3	Salmo	Hwy 3/6 Junction	na
37-1	Hwy 1	Golden	w/b 500m west of Ottoson Rd	TE-90101
38-1	Hwy 1	Revelstoke	e/b 4.5 km east of Columbia River Bridge	TE-90075
38-2	Hwy 1	Revelstoke	w/b 700m W. of Columbia River Bridge – 3 Valley Gap	TE-90074
39-1	Hwy 3	Creston	w/b Jct of Hwy 21	Na
52-1	Hwy 16	Terrace	w/b 2 km west of Terrace	Na
52-2	Hwy 16	Port Edward	2 km east of Port Edward intersection	na

Table 4 Open/Closed Electronic Signs

² CMS signs on Hwy 99 approaching George Massey Tunnel are not controlled by the PHCC. They are part of the contra-flow operations, controlled by the maintenance contractor.

³ Signs 11-4, 13-1, and 13-2 are part of an automated ATIS system. Information on these signs is provided from vehicle detection stations (VDS) located on their respective highways and indicate delays and border crossing wait times.

Sign #	Hwy #	Place	Location	Hwy Eng Ref
15-4	1, 3, 5, 97C	Hope	Hwy 1 e/b 900m west of Hope interchange	TE-85050
15-6	3, 5, 97C	Hope	Old Hwy 3 e/b west of Thacker interchange	TE-87069
21-3	1, 5, 97C	Kamloops	Hwy 1 w/b west of Pacific Way interchange	TE-87069
25-4	5, 97C	Merritt	Hwy 5 s/b 3 km north of Nicola interchange	na
25-6	1, 5	Merritt	Hwy 5 s/b 2 km south of Nicola interchange	na
25-7	5, 97C	Merritt	Hwy 5A/97C e/b .5 km west of Coldwater interchange	na
25-8	5, 97C	Merritt	Hwy 5A/8 1 km east of Coldwater interchange	na
O/C K1	Hwy 3	Nelson	Hwy 3A e/b west of Cottonwood interchange	E-7204
O/C K2	Hwy 3	Nelson	Hwy 6 s/b south of Cottonwood interchange	E-7204
O/C K3	Hwy 3	Creston	Hwy 21 n/b south of Hwy 3/21 Junction	TE-88005
O/C K4	Hwy 3A	Creston	Hwy 3A w/b south of Helen Rd	TE-88005
O/C K5	Hwy 3	Nelway	Hwy 3 e/b east of Hwy 6	E-7742
O/C K6	Hwy 3	Castlegar	Hwy 3 e/b south of Ootichensia interchange	E-7839
O/C K7	Hwy 3	Waneta	Hwy 3B e/b west of Waneta Junction	Na
O/C K8	Hwy 3	Creston	Hwy 3 w/b north of Hwy 3/21 Junction	TE-90016
O/C K9	Hwy 3	Sparwood	Hwy 3 e/b east of Sparwood	na

10.2 ICBC and/ or RCMP/Local Police Road Safety Messages.

Table 5

DATES	EDUCATION AWARENESS
April	Seat Belts Save Lives Are You Clicking In?
May	Please Take Care Motorcycles Are There
June	Get Home Safe Don't Drink and Drive
July & August	Slow Down Keep Your Distance
September	Slow Down Stay Focused On The Road
October	October Is Zero Crash Month Drive Safely
November	Slow Down Keep Your Distance
December	Don't Drink and Drive Road Checks On Now
January to March	Slow Down Keep Your Distance

**SECTION II: PORTABLE CHANGEABLE MESSAGE
SIGNS (PCMS)**

1.0 General

Portable⁴ Changeable Message Signs (PCMS) are shoulder or vehicle mounted temporary traffic control devices that may be used in advance of a condition to supplement and enhance static temporary Traffic Control Devices (TCD). TCDs are used to warn and advise road user of hazards or temporary conditions that may affect the driving task or travel route. PCMSs are frequently specified for use on MoT construction projects. They are used to:

- 1.1 Identify emergency conditions that require road user to alter normal driving patterns.
- 1.2 Identify work zones and provide instruction/warning to road users regarding the nature of the works and required action.
- 1.3 Warn of hazards or abnormal road conditions due to weather, or other incidents that may require road users to proceed with caution.
- 1.4 Inform road users of alternate routes available to minimize travel delays.
- 1.5 Provide road users with advance information regarding the timing of events such as road closures, or traffic pattern changes related to special events that take place.
- 1.6 Reiterate work zone speed limits.
- 1.7 Advise of events that may affect traffic congestion or road closures.

⁴ Permanent CMS signs are referred to as "CMS"

2.0 PCMS Placement

PCMSs should be placed:

- 2.1 Where the sign is visible to road users from 400 to 800m
- 2.2 Where the message is legible to road users at a minimum of 250m, and 150m to 300m in advance of point of action; (detour, work zone, etc) or for low speed locations ($\leq 70\text{km/h}$) and 300m to 1.5km for high speed locations ($\geq 80\text{km/h}$).
- 2.3 The PCMS should be placed with enough lateral clearance between the outside edge of the “raised” sign board and the shoulder fog line/lane edge line to ensure bicycle/pedestrian passage.
- 2.4 The minimum lateral clearance between the outside edge of the raised sign board and shoulder fog line/lane edge line stripe should be 300 mm (12 inches) otherwise the sign boards will likely be prone to being hit.
- 2.5 The traffic management strategy should note the locations where a project does not have sufficient shoulder width to allow for the 300 mm clearance between the fog line/lane edge line stripe and sign board. This lack of shoulder width should not forego the use of PCMSs as they are a great information tool for all road users. As such, Barrel/Flexible Drum delineators should be placed on the approach side of the PCMS device to provide notification and protection for road users including cyclist who might drive so close as to clip the sign board.
- 2.6 Place vertically a minimum of 2.0m from bottom of the sign to the road surface per Section 194.46 of the Standard Specifications for Highway Construction. This will allow “most” cyclist and pedestrians to ride/walk under the sign board.
- 2.7 PCMSs placed in the field should be checked periodically for legibility to ensure the sign face is correctly aimed for approaching road users. This should include a “time-of-day” review to check the impact of the sun, especially during the spring and fall months.

- 2.8 Two or more PCMSs may be used on the same approach. When used, they should be spaced approximately 300m apart.
- 2.9 PCMSs when placed on the road/highway right-of-way should be enhanced with retro-reflective sheeting or devices that delineate the PCMS when it is not in use.
- 2.10 A minimum of three Barrel/Flexible Drum delineators should always be used to shadow the PCMS when it is being used in the field. The Flexible Drums should be placed in front (on the approach side) of the PCMS device.

3.0 PCMS Message Guidelines:

Approximately 1 second is required for a road user to read 1 word or 1.5 to 2.0 seconds per phrase. PCMS messages should convey a single thought and address WHAT the event is, WHEN it occurs and WHAT the road user is required to do. Words such as “WARNING” or “CAUTION” should not be used if these words sacrifice better information. The presence of PCMS implies a change in upcoming travel conditions. The following guidelines should be followed in message design:

- 3.1 Typically PCMSs are limited to 3 lines with 8 characters per line resulting in a maximum message size of 24 characters. Some PCMS provide full matrix boards capable of displaying symbols to enhance the messaging. These symbols may be displayed with or without text.
- 3.2 The message should be able to be read by the road user twice before passing the PCMS while traveling at the speed limit.

3.3 PCMS minimum character size is shown in Table 6.

Minimum Character Size	Speed Limit	Comments
450mm (18")	≥70km/h	Stationary trailer or large truck mounted PCMS. Based on 275m viewing distance. Message must be read 2X at speed limit.
300mm (12")	≥60 km/h ⁵	Based on 150m viewing distance. Message must be read 2X at the speed limit.
250mm (10")	All	Shadow vehicles for mobile operations only. Full matrix signs should display the largest characters possible-300mm is desirable.

3.4 PCMS signs should only be used for transportation and/or safety related messages with the exception of the “Amber Alert” messages. Organizations such as ICBC, RCMP/ Local Police, BC Ferries, and “Special Event” organizers do on occasion use PCMSs on MoT right-of-way and would require the approval of the local BCMoT District Manager, Transportation (DMT), or delegate.

3.5 PCMS should display yellow, orange or green messages using a light illuminating source against a black background. Red messages should be restricted to stop control messages such as “STOP AHEAD.” Note this does not preclude the use of new technologies that may emerge and prove effective for displaying characters other than what is mentioned above.

⁵ PCMS displaying 300mm characters may be used in high speed areas on narrow winding highways where the use of the larger PCMSs may not be feasible due to space limitations. This variance must be approved by the Regional Traffic Engineer or Project Manager.

3.6 A longer message may be displayed in two phases providing the message can be read twice at the speed limit. Each message must be displayed for a minimum of 3 seconds. An example of the typical message sequence is shown below:

Phase 1		Phase 2	
Display 1	Display 2	Display 1 (repeated)	Display 2 (repeated)
ROAD	LEFT	ROAD	LEFT
WORK	LANE	WORK	LANE
5 KM AHD	CLOSED	5 KM AHD	CLOSED

View Time 3 Sec View Time 3 Sec >REPEAT> View Time 3sec View Time 3 Sec

3.7 Don't let the messages displayed for a work zone go stale as one of the most significant problems with PCMSs is credibility. Consider changing the displayed message every 2 – 4 days as this will command attention and help keep regular commuters through a work zone better aware of the operations taking place. Using slightly different phrases on a sign board can inform road users of the same operational issue; i.e. Construction Zone Ahead vs. Equipment and Workers Ahead, or Road Paving Ahead vs. Asphalt Paving Ahead etc., etc., etc.

3.8 If there is no work zone information, incidents or adverse road conditions to report the PCMS may display the local real time and air temperature, or may be turned perpendicular to the flow of traffic so that road users do not see the screen.

4.0 PCMS Operational Guidelines

4.1 PCMS should be in operation continuously and have a back-up system to allow the unit to function if the primary energy source fails. While in operation, the PCMS shall be periodically inspected to ensure it is functioning correctly and displaying the appropriate message. PCMSs should have protection so that only authorized personal have control of message displayed. If the PCMS is not in use it should be positioned off the roadway as not to present a hazard, and be delineated with retro-reflective sheeting and/or other devices.

- 4.2 The PCMS unit should automatically adjust brightness relative to ambient light conditions to maintain visibility.
- 4.3 Additional Information on the set-up and use of Portable Changeable Message Signs (PCMSs) may be found on the FHWA's website. The site has a publication called *Portable Changeable Message Sign Handbook*.
- <http://www.tfrc.gov/pavement/ltp/reports/03066/>

5.0 Message Types and Categories

Table 7 outlines the three major categories of messages and typical messages used on PCMSs. This is not a comprehensive list and other message types may be required to deal with the incident/condition at hand.

Table 7

PCMS Messages

Incidents	Planned Events	Road /Climatic Conditions
Abandoned Vehicle	Avalanche Control	Bare
Avalanche	Bridge	Bare & Dry
Bridge Wash Out	Construction	Bare & Wet
Collision	Bridge	Black Ice
Debris on Road	Maintenance	Blowing Snow
Forest Fire	Construction	Compact Ice
High Winds	Line Painting	Compact Snow
Hazardous Material Spill	Wet Paint	Compact Snow Chains Required
Hydro Lines Down	Mowing	Compact Snow Plowing & Sanding
Livestock on Road	Paving	Compact Snow Slippery
Material Spill	No Shoulder	Sections
Vehicle Crash	Do Not Pass	Compact Snow Sanded
Mud Slide	Detour	Falling Ice
Police Incident	Road Construction	Falling Rock
Rock Slide	Road Maintenance	Flooding
Traffic Signal Failure	Trucks Crossing	Freezing Rain
Vehicle Fire	Rock Scaling	Frost Heaves
Vehicle Stall	Seal Coating	Heavy Snowfall
Accident Ahead....Road	Special Event	Heavy Snowfall with Plowing & Sanding
Closed	Exit XX Closed	High Avalanche Hazard
Wash Out	Use Hwy XX	Limited Visibility Blowing Snow
Wildlife on Road	XXX Ahead	Limited Visibility Fog
■ Big Horn	Ahead	Limited Visibility Heavy Snowfall
Sheep	Single Lane Traffic	Limited Visibility Smoke
■ Elk	Right Lane Closed	Plowing & Sanding In Progress
■ Caribou	Left Lane Closed	Slippery Sections
	Centre Lane	Slushy Sections
	Closed	Smoke
	Exit Closed Ahead	Traffic Congestion
	Ramp Closed	All Trucks Chains Required
	Ahead	Water Ponding
	Slow Near Equip	Bump Ahead
	Const Speed Limit	
	60 km/hr	

6.0 Message Abbreviations

The message may contain abbreviations but should be limited to commonly known ones as shown in the Table 8.

Table 3 PCMS Message Abbreviations

Word	Abbr.	Word	Abbrev.
Ahead	AHD	Maintenance	MAINT
Alternating/Alternate	ALT	Mountain Standard Time	MST
Boulevard	BLVD	Mountain Daylight Time	MDT
Bridge	BRDG	Pacific Standard Time	PST
Cardinal Dir.	N, E, W, S	Pacific Daylight Time	PDT
Construction	CONST	Prepare	PREP
Emergency	EMER	Pavement	PVMT
Entrance	ENT	Parking	PKING
Equipment	EQUIP		
Exit	EXT	Route	RTE
Freeway	FWY	Road	RD
Hazardous	HAZ	Right	RT
Highway	HWY	Shoulder	SHLDR
Information	INFO	Slippery	SLIP
Junction	JCT	Speed	SPD
Kilometre	KM	Summit	SMT
Lane	LN	Traffic	TRAF
Left	LFT	Warning	WARN
Minutes	MIN	Vehicle	VEH
Minor	MNR		

7.0 Sample PCMS Messages:

HWY 3
CLOSED
AVALANCHE

BRIDGE
WORK AHD
1 LN OPEN

TCP AHD
PREPARE
TO STOP

ACCIDENT
AHD - USE
EXT 1 2 3

LT LANE
CLOSED
AHEAD

BIG HORN
SHEEP
NEXT 30KM

LINE
PAINTING
9-3 DAILY

SINGLE
LN TRAF
AHD

ROAD
CLOSED
FLOODING

10:30AM PST

8.0 Authority for PCMS use:

PCMSs units may be authorized for use on MoT roads by:

- 8.1 District Manager, Transportation (DMT) or delegate
- 8.2 Regional Traffic Engineer
- 8.3 Project Supervisor or delegate
- 8.4 Project Traffic Control Engineer
- 8.5 Traffic Control Supervisor

9.0 References

Federal Highway Administration (ND) *Portable Changeable Message Sign Handbook*. Report FHWA-RD-03-066, US Department of Transportation, Washington DC USA

American Traffic Safety Service Association (1994) *Guidelines for the Use of Portable Changeable Message Signs*.

Federal Highway Administration (2003) *Manual on Uniform Traffic Control Devices (MUTCD)*
US Department of Transportation, Washington DC