REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

097.13 DPWH
11-3-97 (12)

22 August 1997

DEPARTMENT ORDER
NO. 179 of 11/3
s. 1997

SUBJECT : Revised Guidelines of Inspection to Rate the Physical Condition of National Roads and Bridges

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With the maintenance of national roads and bridges being of paramount priority of the Department, there is therefore a need to monitor periodically the over-all condition of all national roads and bridges and assess in the process, the performance of Highway Regionall/District Engineers on the conduct of maintenance.

In this regard, the Inspectorate Division of the Bureau of Maintenance, this Department, shall conduct every semester, or when the need so warrants, the physical condition of national roads and bridges using the attached Inspection Format, herein revised to give **equal** emphasis on roadside (shoulders, drainage, vegetation control) maintenance and maintenance of carriageway.

In the conduct of inspection, the Inspectorate Team shall be guided by the following :

1. To attain a fair and objective assessment, the coverage of inspection must be 100%. The objective of such undertaking is to pinpoint those national roads in which its physical condition warrants the application of immediate maintenance action and thereafter subsequently carry out corresponding maintenance activity to upgrade its present condition.

2. To be included in subject Rating are those roads undergoing construction/rehabilitation, but which are, at the time of inspection, still left "untouched" by the Contractor/s.

Further, a situational report is hereby expected of all on-going construction projects along national roads giving utmost attention to the following : lack of adequate warning signs and/or appropriate barricades; absence of flagmen directing traffic; and other relevant factors causing delay in the smooth flow of vehicular traffic.

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For bridges along national roads, four (4) different scores shall each correspond to those bridges which are noted to be either with potholes, etc. (permanent bridges), or with lacking running boards (temporary bridges); or with presence of broken railings; unpainted; with no proper signage (no legible bridge name, no load limit signs, and no station/km. limit); presence of debris obstructing the channel, and such scores shall form part of the computation for general condition rating (roads and bridges). The Guide in Rating the Condition of bridges is herewith attached under page 10 of this Guidelines.

3. *The BOM Inspectorate Team shall be joined by the District Maintenance Engineer or the District Maintenance Area Engineer and the representative/s of the DPWH Regional Maintenance Division who will all be required to conduct their own physical condition rating, accomplish the worksheet and attest to the joint (BOM, Regional and District) findings.*

4. *"Back-up Sheets" to support all condition ratings shall likewise be a part of every report to be submitted to the Director, Bureau of Maintenance within seven (7) working days from the Inspectorate's scheduled time of arrival.*

For compliance.

GREGORIO R. VIGILAR
Secretary

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ROAD CONDITION RATING

The overall condition has been, based on the initial field inspections, classified into 4 groups, with a classification from 4 to 1, with figure "4", as the optimize figure, and "1" as the lowest.

4.) Good : The completed road appears in a sound and well maintained condition, very few minor failures could appear, such as few potholes, minor areas with alligator cracks, ruts and depressions.

3.) Fair : When the general view seems to contain very rare failures and damages to the carriageway, such as potholes, rutting and edge failures. The level of maintenance effort seems to be slightly average.

2.) Poor : When the carriageway appears with as many failures and damages and failed section; the shoulders are eroded and ponds and softspots apparent; the drainage system hardly functions mainly caused by sedimentation and hardly no vegetation control is applied. The maintenance state is low.

1.) Beyond Repair: When the carriageway, is scattered with several failures and damages, more sections of the road has failed. The shoulders are eroded badly with ponding water along the edge of the carriageway. The drainages are silted and the vegetation seems to be out of control. The quantities required to bring the road to a reasonable standard are largely exceeding the most cost effective solutions.

ENCLOSURE 1

Example use of the Field Inspection Sheets and the initial processing of the information contained.

The recordings are taken on "as it is" basis; therefore the recording indicates the actual condition of the road and the maintenance work required to bring the road up to the standard of a well maintained road.

On the initial stage, the recordings enable the Inspector to compare the overall condition and the maintenance demand for the various road sections.

In the future, the form can be used annually on a semestral basis, for two purposes:

1.) To assess if the maintenance effort has been sufficient.
2.) To monitor the overall condition of the road sections.

The Field Inspection Form are filled in for every km, using the marking on the km-counter in the car and the following recordings are taken:

AVERAGE ROAD CONDITION: This refers to the general impression of the road, roadside areas, condition of shoulders and drainage and vegetation control. Divided into Good, Fair, Poor and Very Poor (means beyond the scope of cost sufficient maintenance), the Inspectors will fill in the form, by using an "x" mark.

CARRIAGEWAY: Three recordings has to be made for each 1 km. An "A" is written to indicate the extent of minor failures, (potholes, depressed cracked areas). If the extent is less than 5 sq.m. per km, the "A" will be placed in the box with number "4", if the extent of failure is from 6 to 20 sq.m./km, the "A" shall be in the box with number "3" and so forth.

The second recording is the extent of the failed section: this could be a section which is regularly flooded or for other reasons, the road has failed in the full width. Thus, the recording will be made by filling in a "B" in one of the four numeral boxes. The same procedure is followed by filling in a "C" to indicate the signs of cracks and deterioration.

SHOULDER/VEGETATION CONTROL: In respect of the shoulders, the sq. m./km. requiring filling, levelling and compaction will be indicated. Failures noted on vegetation control shall however be in linear meter/km.

Inspectorate Team shall therefore check if the shoulder has proper cross section/defined width and grade, with the purpose of checking if:

a) adequate side support are provided to the existing pavement;
b) traffic can utilize the shoulders at speed and without hazard;
c) temporary/emergency parking is possible;
d) surface drainage from the carriageway to the roadside ditch is possible.

The types of failures, damage or distress on shoulders are:

1) obstruction on shoulders (e.g., rocks left behind by careless drivers after using them as support when repairing their vehicles; tree branches; soil heaps; etc.)
2) shoulder surface at a higher level than carriageway surface ("inverted shoulder")
3) potholes, ruts and depressions
4) high vegetation thereby damaging the slope drainage system (i.e., slope is overgrown with vegetation)
5) presence of ponds of water and softspots (due to constant wear and tear by vehicles, animal traffic and softening/erosion by surface water)

6) low shoulders (i.e., shoulder surface at a lower level than carriageway surface); due in part when the carriageway has been repaved leaving the shoulder surface at a lower level; or low shoulders due to slips and settlement.

Recordings of failures/damages/distress on shoulders shall be made by placing an "x" mark on the appropriate box when any of the failures/damages as noted herein occured within the ranges as detailed below, thus:

4 - GOOD	:	0 - 50 sq.m./km.
3 - FAIR	:	51 - 100 sq.m./km.
2 - POOR	:	101 - 200 sq.m./km.
1 - VERY POOR:	>	200 sq.m./km.

For vegetation, the above ranges shall apply but units of measurements shall be in linear meter/km.

DRAINAGE: The Inspectors shall record the presence of any or all of the following failures/damages that usually render the functions of drainage system unsatisfactory:

1) ditch cross-section destroyed;
2) ponding in ditch and on shoulder due to lack of sufficient lateral drainage (turn-outs);
3) silting (blockage by debris and vegetation);
4) uneven ditch invert* (either it is too flat that water cannot flow at sufficient velocity or it is too steep that water flows at a high velocity carrying away the soil thereby causing the ditch to become deeper);

*Invert - the lowest point in the interval cross-section of a ditch or culvert

5) erosion of stream bed at culvert outlet or settlement of soil below culvert.

Recordings of the presence of any or all the failures/damages as noted shall be made using the ranges cited above but the unit to be used shall be in linear meter/km.

By carrying out this inspection, the effort of maintenance and the overall physical condition of the road and roadside features are therefore monitored and assessed.

GUIDE IN RATING THE CONDITION OF NATIONAL ROADS:

I What is to be rated for every kilometer of road?

CARRIAGEWAY:

For Concrete	:	Minor failures, failed sections and cracks.
For Asphalt	:	Minor failures and failed sections.
For Gravel	:	Minor failures and failed sections.

ROADSIDES:

For Concrete	:	Shoulders, Vegetation Control/Visibility and Drainage
For Asphalt	:	Shoulders, Vegetation Control/Visibility and Drainage
For Gravel	:	Vegetation Control/Visibility and Drainage only

II. Types of Failures/Damages on Carriageway:

A. Minor Failures

For Concrete: a) Scaling/Spalling
b) Depressions
c) Cracks

For Asphalt : a) Potholes
b) Depressions with cracks
c) Ruts
d) Shoving
e) Severe Cracks (longitudinal, transverse, mesh/alligator)

For Gravel : a) Potholes
b) Depressions
c) Ruts
d) uncompacted (very loose) materials

B. Failed Sections

For Concrete: a) Base failures affecting the whole width of the road
b) Depressed sections with cracks affecting part of a lane block or the whole width of the road

For Asphalt : a) Evidence of base failure affecting part or the whole width of the road
b) Cavernous potholes affecting part or the whole width of the road

For Gravel : a) Depressed sections with ruts and potholes affecting the whole width of the road
b) Eroded roadway

C. Cracks

For concrete only: a) Longitudinal/transverse cracks
b) Shrinkage cracks

III. Ranges of Failure for Carriageway:

A. Minor Failures (for all types of pavement)

Score:
4 - GOOD - 0 to 5 sq.m./km
3 - FAIR - 6 to 20 sq.m./km
2 - POOR - 21 to 50 sq.m./km
1 - VERY POOR - > 50 sq.m./km

B. Failed Sections (for all types of pavement)

Score:
4 - GOOD - 0 to 5 sq.m./km.
3 - FAIR - 6 to 20 sq.m./km
2 - POOR - 21 to 50 sq.m./km
1 - VERY POOR - > 50 sq.m./km

C. Cracks :

Score:
4 - GOOD - None
3 - FAIR - Rare
2 - POOR - Several
1 - VERY POOR - Common

IV. Types of Failures/Damages on Roadsides Areas:

A. Shoulder

a) obstruction on shoulders (e.g., rocks left behind by careless drivers after using them as support when repairing their vehicles, tree branches, soil heaps, etc.)

b) shoulder surface at a higher level than carriageway surface ("inverted shoulders")

c) potholes, ruts and depressions

d) high vegetation, thereby damaging the slope drainage system

e) presence of ponds of water and softspots on low shoulders

Ranges of failures/damages: (Shoulders)

Score:

4 - Good	:	0 to 50 sq. m./km.
3 - Fair	:	51 to 100 sq. m./km.
2 - Poor	:	101 to 200 sq. m./km.
1 - Very Poor:		> 200 sq. m./km.

B. Vegetation Control/Visibility

Types of Damages:

a) Lush vegetation hampering visibility at road curve
b) Presence of tall grasses/weeds
c) Vegetation damaging the slope drainage system

Ranges of Failures/damages:

Score:

4 :	0 to	50 Lin. m./km.
3 :	51 to	100 Lin. m./km.
2 :	101 to	200 Lin. m./km.
1 :	>	200 Lin. m./km.

C. Drainages:

Types of damages:

1) ditch cross-section destroyed
2) ponding in ditch and on shoulder due to lack of sufficient lateral drainage (turn-outs)
3) silting (blockage by debris and vegetation)
4) uneven ditch invert* (either it is too flat that water cannot flow at sufficient velocity or it is too steep that water flows at a high velocity carrying away the soil thereby causing the ditch to become deeper)

*Invert - the lowest point in the interval cross-section of a ditch or culvert

5) erosion of stream bed at culvert outlet or settlement of soil below culvert.

Ranges of failures/damages:

Score:
4 : 0 to 50 Lin. m./km.
3 : 50 to 100 Lin. m./km.
2 : 101 to 200 Lin. m./km.
1 : > 200 Lin. m./km.

GUIDE IN RATING THE CONDITION OF BRIDGES:

1) The task is to carry out the inspection to check that bridges are safe for traffic. Thus, where a bridge spans over water, the water must flow unimpeded at all flood levels without damaging the bridge on the waterway.

2) The bridges to be rated are those located along national roads including those along national secondary roads. (Permanent Bridges of concrete or steel or a combination thereof and Temporary Bridges of wooden or bailey type).

3) The bridge inspection shall be conducted simultaneously with the inspection to rate the physical condition of national roads.

4) Inspection shall focus only on the presence of the following bridge deficiency (and hence, subject inspection shall exclude the physical investigation for bridge parts/structures such as beams, girders, stringers, etc. since such investigation shall be conducted under a separate medium), to wit:

   a) Potholes for permanent bridges. Includes reporting of unevenness of pavement surface which can cause excessive vehicle impact on bridge; or differential settlement at joints between approach pavement and bridge, deterioration and wear (exposed reinforced steel), ponding of water on bridge deck. For temporary bridges, lack of running boards.

   b) Presence of broken railings or in case of temporary bridges, presence of decayed, damaged or missing guardrails;

   c) unpainted bridge

      - bridge devoid of paints
      - unclean/dishevelled bridge due in part to either a peeled off paint or faded paint
      - bridge with graffiti or posters.

      Also, includes reporting of lush vegetation along railings or at sides of bridge approaches.

d) absence of proper signage, i.e. advance warning signs (narrow bridge, vehicle weight limit, speed limit). Includes checking if signs are on proper location, in good condition and that lettering is clear, legible and visible to approaching traffic.

e) accumulation of debris (floating logs, junks, etc.) obstructing the channel.

Score:

4	-	Good	-	no deficiencies noted
3	-	Fair	-	Presence of only one out of five aforecited deficiency
2	-	Poor	-	Presence of two out of five aforecited deficiency
1	-	Very Poor		Presence of more than two of the aforecited deficiency

TABLE 1
EMK and CORRESPONDING ALLOCATIONS
SUMMARY on a 5-Year Period
(1994 to 1998)

	1194		1995		1996		1997		1998	
	EMK	ALLOCATION	EMK	ALLOCATION	EMK	ALLOCATION	EMK	ALLOCATION	EMK	ALLOCATION
		P33,500/EMK		P62,463/EMK		P63,351/EMK		P66,835/EMK		P70,835/EMK
ROADS	a) 44,172.166	1,479,764.00	44,622.333	2,787,243.00	46,520.857	2,947,153.00	46,520.519	3,109,200.00	46,119.402	3,251,929.00
BRIDGES	b) 7,440.831	249,271.00	7,205.428	450,074.00	7,135.481	452,030.00	7,135.481	476,899.00	6,297.839	444,065.00
T O T A L	c) 51,612.997	1,729,035.00	51,827.761	3,237,317.00	53,656.338	3,399,183.00	53,656.000	3,586,099.00	52,417.241	3,695,994.00
% Weigth (Roads) a/c %	85.58	85.58	86.10	86.10	86.70	86.70	86.70	86.70	87.99	87.99
% Weight (Bridge) b/c%	14.42	14.42	13.90	13.90	13.30	13.30	13.30	13.30	12.01	12.01

$$\text{Ave. Weight, Roads} : \frac{85.58 + 86.10 + 86.70 + 86.70 + 86.70 + 87.99}{5} = 86.6 = 85\%\ **$$

$$\text{Ave. Weight, Bridges} : \frac{14.42 + 13.90 + 13.30 + 13.30 + 12.01}{5} = 13.4 = 15\%\ **$$

** Rounded off to the nearest number divisible by 5

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ROAD AND BRIDGE CONDITION RATING

NAME OF ROAD: AB Road km 0+000 to km 5+490

DATE OF INSPECTION: September 1997

Classification: _____

District/City: _____

STATION NOS.		CARRIAGEWAY					Ave. C'way	ROADSIDE FEATURE													Ave. Road-	Ave. Road	BRIDGE						Ave. Bridge	GENERAL CONDITION Average
								SHOULDER					VEGETATION				DRAINAGE						Score						
FROM	TO	Type	4	3	2	1	Condition	Type	4	3	2	1	4	3	2	1	4	3	2	1	side Cond.	Cond.	Type	4	3	2	1	Cond.	Roads & Bridges
0+000	1+000	C	AB	C			3.67	G													2.67	3.17							
	0+350	RAMOS BRIDGE																					RCDG						
	0+800	MARCOS BRIDGE																					BAILEY					3.5	3.22
1+000	3+000	C	ABC				4.00	G													2.33	3.17						-	3.17
	3+000	C	B	AC			3.33	G													2.33	2.83						3.0	2.86
	0+150	MELDA BRIDGE																					RCDG						
	1+900	AMELITA BRIDGE																					RCDG						
3+000	4+000	C	B		AC		3	G													3.0	3.0						-	3.0
4+000	5+000	C	B		AC		3	G													3.0	3.0						-	3.0
	5+490	C	B		AC		3	G													3.0	3.0						-	3.0

SCORE				
CARRIAGEWAY	4	3	2	1
A - Minor Failure	0-5 sq.m./km	5-20 sq.m./km	21-50sq.m./km	51 UP
B - Failed Section	0-5 sq.m./km	5-20 sq.m./km	21-50sq.m./km	51 UP
C - Cracks	NONE	RARE	SEVERAL	COMMON

Road side Features:	SCORE 4	3	2	1
Shoulders	0-50sq.m./km.	51-100sq.m./km.	101-200sq.m./km.	201UP
Veg. Control	0.50Lin.M./km.	51-100Lin.M./km.	101-200Lin.M./km.	201UP
Drainage	0.50Lin.M./km	51-100Lin.M./km	101-200Lin.M./km	201UP

ROADS	
Score	Adj. Rating
3.5 - 4.0	GOOD
3.0 - 3.4	FAIR
2.0 - 2.9	POOR
1.0 - 1.9	VERY POOR

LEGEND:

BRIDGE		
Deficiencies:	Score:	Adj. Rating
a) potholes	4-absence of any 1 deficiency	GOOD
b) broken railings	3-presence of only 1 out of 4 deficiencies	FAIR
c) unpainted bridge	2-presence of 2 out of 4 deficiencies	POOR
d) no proper signage.	1-presence of more than 2 deficiencies	VERY POOR

RC = ROAD CONDITION, (%), = $\dfrac{\text{1/2 Ave. Carriageway + 1/2 (Ave. Road side Condition}}{4} \times 100 = \dfrac{3.17+3.17+2.83+3+3+3(0.49)}{5.49} = 3.03 \times 25 = 75.75\%$

BC = BRIDGE CONDITION, % = $\dfrac{\text{Score}}{4} \times 100 = \dfrac{3+4+3+3}{4} = 3.25 \times 25 = 81.25\%$

General Condition = 85% (RC) + 15% (BC) = 85% (75.75) + 15% (81.25) = 76.59%

INSPECTED BY:

_____ (DISTRICT/CITY REPRESENTATIVE)

_____ (REGIONAL REPRESENTATIVE)

_____ (BOM REPRESENTATIVE)

SAMPLE ONLY