



Government of Jammu and Kashmir
Public Works(R&B) Department
Civil Secretariat Srinagar/Jammu

Subject: Standing operating Procedure (SOP) for optimal maintenance of roads during snow clearance"

Reference: Administrative Council Decision No:13/01/2022 Dated:29.01.2022.

Govt. Order No. 76-PW(R&B) of 2022
Dated: 28-02-2022

Sanction is hereby accorded to:

- i. Acceptance of report of the Committee constituted vide Government Order No. 1056-JK(GAD) of 2021 dated. 06.10.2021 to suggest measures/SOP for optimal maintenance of roads during snow clearance appended as Annexure-I to this order.
- ii. Authorization to PW(R&B) department for implementing short term measures recommended by the Committee following due procedure from its 2022-23 budget.
- iii. Finance Department and Disaster Management Relief Rehabilitation and Reconstruction Department to consider the implementation of long terms measures recommended by the committee in next three years.

By order of the Government of Jammu & Kashmir.

Sd/-
(Shailendra Kumar) IAS
Principal Secretary to Government,
PW (R&B) Department

No:- PWD-ACCT/38/2022-08-Department of PWD R&B

Dated: 28-02-2022.

Copy to the:-

1. Joint Secretary (J&K), Ministry of Home Affairs, Govt. of India.
2. Secretary to Govt. Disaster Management Relief Rehabilitation and Reconstruction Department.
3. Development Commissioner (Works).
4. Director Archives, Archeology & Museum J&K, Srinagar.
5. Chief Engineer PW(R&B) Kashmir/Jammu.
6. Chief Engineer PMGSY Kashmir/Jammu.
7. Chief Engineer DIQC, J&K.
8. Chief Engineer Mughal Road Project.
9. Chief Engineer Mechanical Engineering Department Jammu/Kashmir.
10. OSD to Advisor (B) for information.
11. Private Secretary to Financial Commissioner (Additional Chief Secretary) Finance Department.
12. Private Secretary to Principal Secretary to Government PW(R&B) Department.
13. Govt. Order file. (w.2.s.c).

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**Government of Jammu and Kashmir
Public Works (R&B) Department
Civil Secretariat, Jammu/ Srinagar**

No. PWD-ACCT/316/2021-05

Dated: 13 - 12 - 2021

Subject: Constitution of a committee to suggest measures/ SoPs for optimal maintenance of roads during snow clearance without damaging the roads.

Reference: Govt Order No 1056-JK(GAD) of 2021 dated 06.10.2021.

The Committee constituted by GAD vide above quoted Government Order met on 29.11.2021 and 06.12.2021 to suggest measures/ SOPs for optimal maintenance of roads during snow clearance without damaging the roads.

It may be mentioned that no representative of Central Building Research Institute, Roorkee Uttarakhand participated in the meetings, while as, CPWD Jammu informed that it is not executing snow clearance works and for co-opting the CPWD officers for such meetings, matter may be taken up with CPWD Directorate New Delhi for nominating appropriate representative.

The undersigned is directed to enclose herewith the report finalized by the Committee for further action in the matter expeditiously.

Joint Director (Planning),
Public Works (R&B) Department

Principal Secretary to Government,
General Administration Department.

Encl: A/A

Report on Measures for minimum damage to roads during Snow Clearance

1. Introduction:

Snow removal is the job of removing snow after a snowfall to make travel easier and safer on R&B roads. Snow and ice removal operation is one of the critical functions of J&K R&B and local authorities in cold regions. The snow clearance of all major roads in UT of J&K is done through Mechanical Engineering Department and other roads are snow cleared by R&B, PMGSY and SMC as the case may be. Using mechanically approved machines for snow clearance are paramount but in the absence of desired and required number of machinery with MED many roads are cleared of snow through stage contractors who use JCB or tractors for snow clearance. Internal roads, link roads and village roads are snow cleared through JCB etc. by R&B, PMGSY, Municipal Corporations and Town Area Committees. With every snowfall occurrence which happens a number of times annually, same road length is required to be cleared by UT agencies and same process is repeated in the next snowfall in the same year. Thus absolute Km of road cleared in the data presentation may be read with this perspective.

2. (a) The total road length of Union Territory of Jammu & Kashmir is 39500 kms, out of which 21798 km of road length requires snow clearance. Last year snow clearance details are as under:-

Road Length for Snow Clearance

Division	Department	No. of Roads (No's)	Length (in Km)
Kashmir	MED Kashmir	1834	8663
	R&B Kashmir	3019	7611.33

	PMGSY Kashmir	413	1443.01
	Total	5266	17717.34
Jammu	MED Jammu	108	1042
	R&B Jammu	274	1285.95
	PMGSY Jammu	311	1757.82
	Total	693	4080.77
	Grand Total*	5959	21798.11

*Above figures have upward trend each year.

(b) Besides this, snow clearance for about 570 Km road length is undertaken by NHAI, NHIDCL and BRO.

(c) In J&K Snow clearance undertaken by MED, R&B and PMGSY is carried out by 65 Divisions as per the following details:-

Department / Division wise details of snow clearance operation

S.No	Departments	Province	
		Kashmir (No. of Divisions)	Jammu (No. of Divisions)
1.	MED	3	4
2.	R&B	25	11
3.	PMGSY	10	12
	Total	38	27
	Grand Total:	65 Divisions	

3. Snowfall and snow clearance operation:

(a) The critical time period for snowfall and subsequent snow clearance in Kashmir and snow bound areas of Jammu region is mostly from 21st December to 30th January. Snow clearance control rooms are established at provincial level, circle level and division level well before onset of winter

every year with duty rosters issued to officials for snow clearance duty. Road wise / sector wise / block wise / ward wise duty rosters are circulated with District / Divisional administration with contact no's / Mail IDs of the officers / officials.

(b) Tender process for the snow clearance of roads under PWD / PMGSY are completed well in advance before winter.

(c) The snow clearance action plan is primarily divided into two parts:-

- i. Priority 1st Roads and
- ii. Priority 2nd Roads.

Priority 1st includes roads leading to Hospitals, Water Supply Schemes, Electrical Installations, Main City / Town roads, Roads connecting UT Capital with District Hqrs., Inter District roads, Tourist destinations, etc., and the remaining roads are taken up under Priority 2nd. In Srinagar and other towns experiencing snow, need snow clearance twice/ thrice when roof and lawn snow are thrown on roads by inhabitants.

As and when weather advisory regarding snow forecast is issued, the officers / officials on duty keep men and machinery ready for snow clearance operations and continues 24x7 till such time the roads are cleared of snow. All control rooms are intimated by snow clearance duty officials about the status of roads and depth of snow at regular intervals.

(d) Snow clearance by the Mechanical Engineering Department is being done professionally with snow clearance machines such as:

- (1) Snow ploughs,
- (2) Snow cutters,

- (3) Snow Blowers,
 - (4) Unimog,
 - (5) Back-hoe (Front end and Back end loaders),
 - (6) Dozer D-50 (Motor grader).
- (e) Mechanized Snow Clearance in Kashmir during winter over major roads is in practice over the years to ensure smooth commute on the roads in the aftermath of a snowfall. As first responders to the disruption caused by a snowfall, the MED Department clears roads and open arteries of communication for restoration of basic necessities like electricity and water supply and ensure access to health centers and administrative units paving way for resumption of economic activities.
- (f) As per the practice followed in Europe and America, the snow clearance machinery of MED is usually provided with a front-end mounted snow clearance attachment. Whereas, the special Purpose snow clearance machinery (viz Unimog M/C's of Mercedes Benz-Germany) and Snow cutters/blowers are company fitted composite machines of European manufactures that come with a high price tag. However, cost effective solutions have been devised by MED by attaching a variable snow plow (Foreign imported) to a high power, 4x4 driven TATA/Ashok Leyland Truck chassis or a locally fabricated fixed wedge shaped plow fixed to a tractor.
- (g) The snow clearance entrusted to PW (R&B) Department and PMGSY is done through stage contractors to whom the contracts are allotted well before the onset of winter which causes the most damages.
- (h) 3 years data showing number of falls along with average snow depth is given hereunder:-

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Snow-fall occurrences in J&K and depth of snow

Year	No. of falls	Max. snow depth (in inches)	Avg. depth each time (in inches)
2018-19	9	54	14
2019-20	9	60	15
2020-21	7	72	19

Snowfall continues for two to five days in single fall mentioned above and snow clearances remains in progress continuously to keep roads traffic worthy.

4. Damages and Repairs:

- (a) The damages to road surface due to snow takes place mostly on the roads for which snow clearance is done through contracting agencies as they are not equipped with appropriate snow clearance machinery and use available machinery such as tractors and JCBs.

In order to counter the otherwise unavoidable deterioration process, road maintenance, carried out periodically and taking better snow clearance measures, is a better policy. One type of maintenance is corrective maintenance, which aims to repair the damage that has occurred. Repairs are made to the road surface generally restoring the road to good condition. Improved road condition results in shorter travel time and lower transport costs, and decrease in the speed of deteriorations which starts from scratch. The more deteriorated the road is, the more intensive and costly repairs will be. While the road is still in fair weather condition, corrective maintenance may simply entail patching potholes, reforming the road surface and undertaking minor repairs to the road structures.

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9/11/2021

Figure 1

Illustration of deterioration effects on a non-maintained road

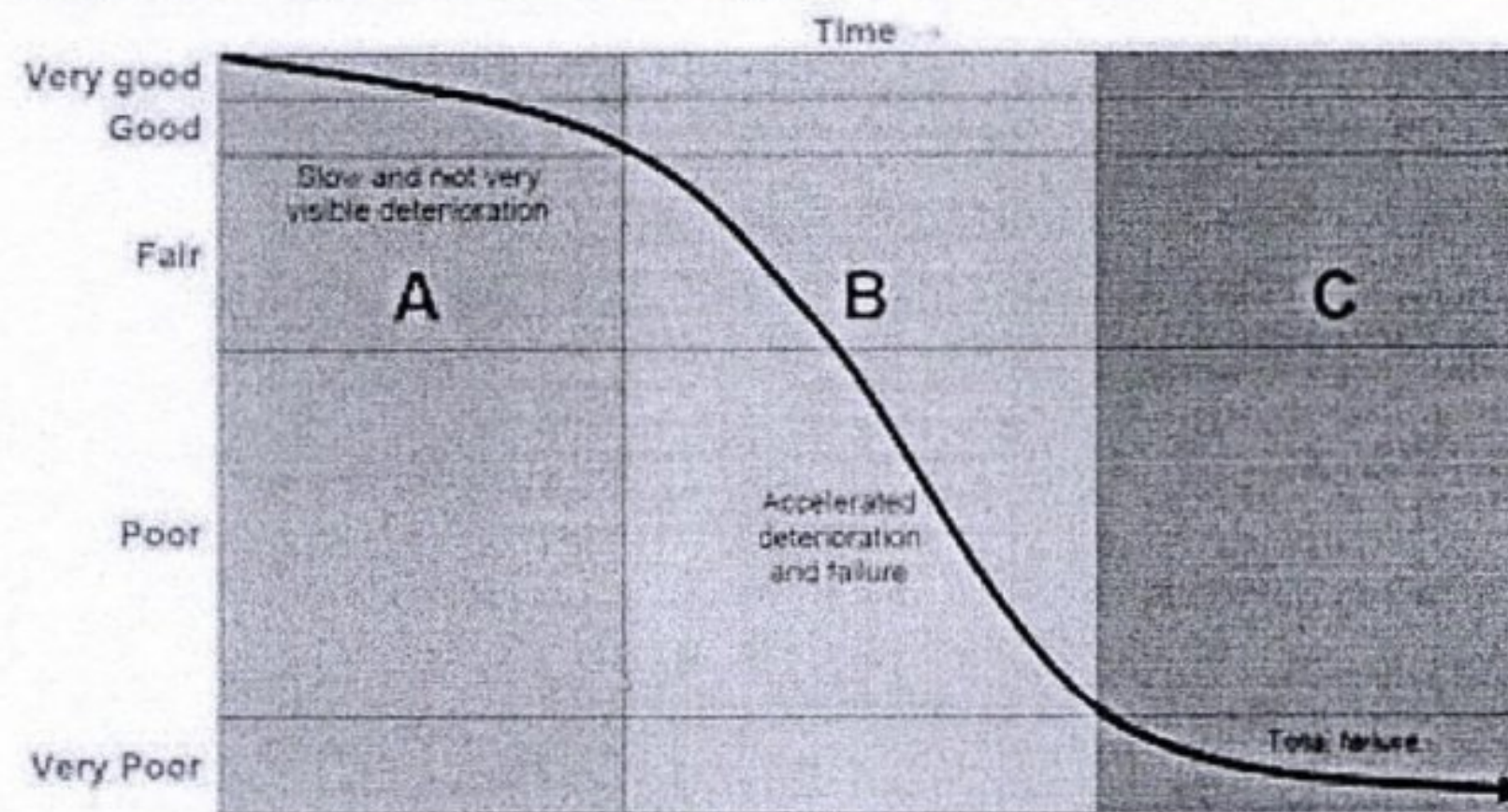
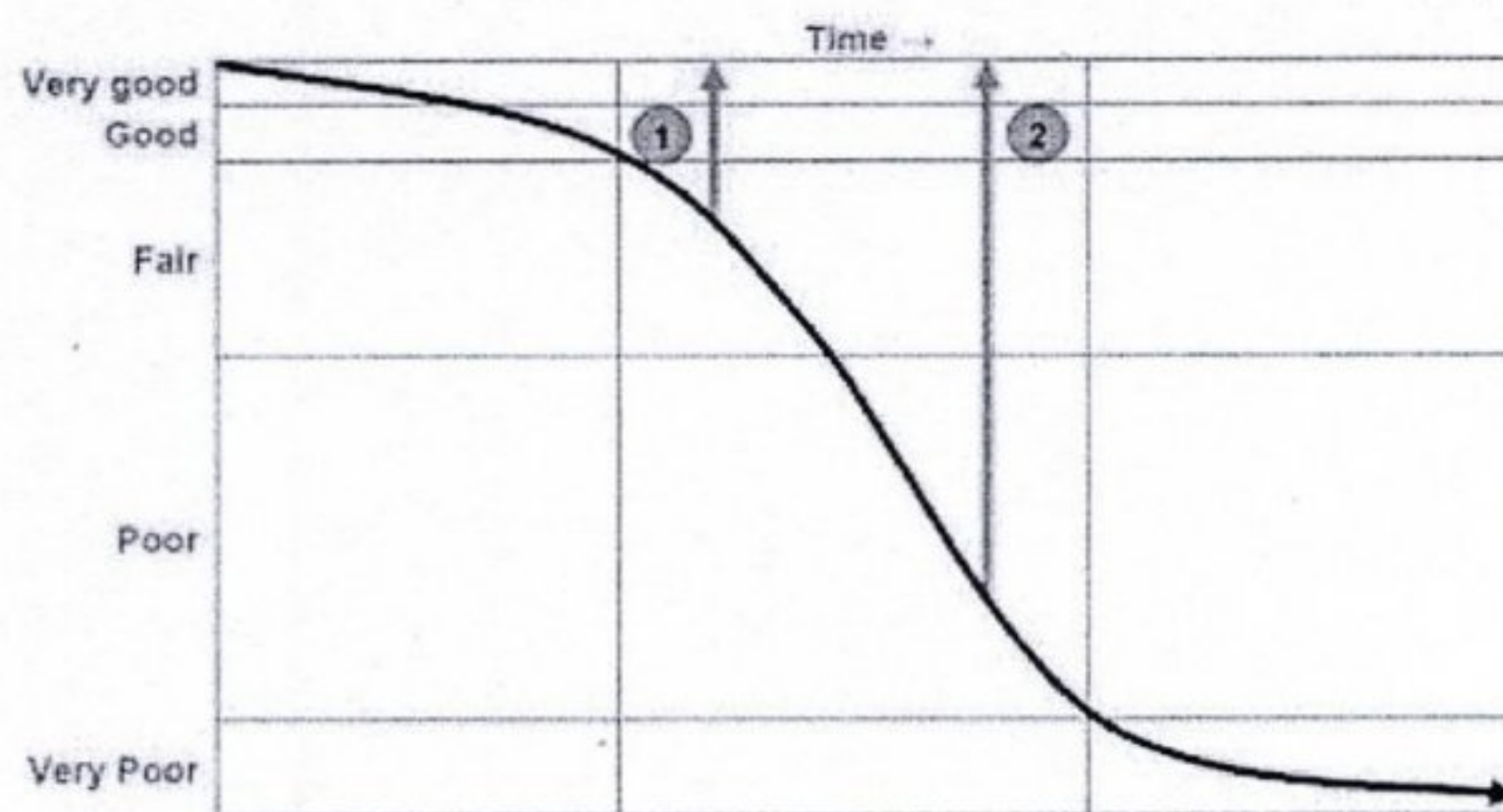


Figure 2

Illustration of corrective maintenance cost



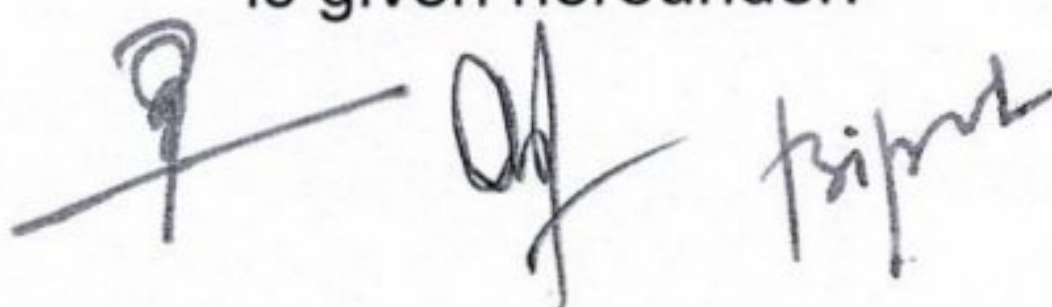
- (b) The condition of the road can be improved by carrying out corrective maintenance. Repairs are made to the road surface, shoulder and other physical road structures. The more deteriorated the road is, the more intensive and thus costly the repairs will be (Figure 2). For instance, corrective maintenance when the road is still in good or fair condition (Figure 2 arrow 1) may entail patching potholes and minor repairs to the road. However corrective maintenance carried out once the road is already

in poor condition (Figure 2 arrow 2), is likely to entail complete resurfacing and possible reconstruction of the road base. The distance from the line (in black colour) indicating the road condition, to the desired good or very good condition of the road is therefore indicative of the level of corrective maintenance required and thus for the cost of this maintenance.

- (c) The road length cleared by contracting agencies by crude machinery is required to be done with appropriate snow clearance machines. There is need to engage professional agencies along with the Mechanical Engineering Department for effective and timely snow clearance operations. For this purpose, private players willing to procure such machinery need to be incentivized by way of empanelment and awarding contracts for longer periods of 10-15 years with assured increase of rates as per norms of MoRTH and prevalent Schedule of Rates, with admissible escalations on labour and machinery.
- (d) During snow clearance damages to road surface have been observed to take place mostly on the worn out road surfaces for which the macadamization has been done 3 - 5 years before. However, in case the damage to road surface after snowfall is attributed to poor execution of macadamization rather than snow clearance operation, the same is got rectified / restored / re-laid through the contractor who has executed the work, without any extra cost, under defect liability period (DLP).

After winter of 2020-21, the details of roads rectified / restored under DLP is given hereunder:-

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Road Restoration in J&K under Defect Liability Period (2020-21)

S.No	Department	No. of Roads	Restoration work executed under DLP (Km)
1	R&B Kashmir	24	7.09
2	PMGSY Kashmir	14	5.2
3	R&B Jammu	11	5.12
4	PMGSY Jammu	6	1.65
	Total	98	19.06

5. New Technology and Methods for snow clearance:

Road is a key component of socio-economic activity and has to be made available for general public at all times. In order to promote cost effective and fast snow clearance mechanism, it is imperative to adopt new technologies and undertake initiatives beyond conventional methods.

Chief Engineer, Mechanical Engineering Department, Kashmir has fabricated an attachment suitable for JCBs and tractors used by contracting agencies for snow clearance. The details of sample attachment are given below.

Note: Dimensions mentioned against each item may be used as reference and are subject to change as per the model of Back Hoe Loader quoted for.



The Mechanical Engineering Department Kashmir is also exploring the possibility of using ultra high density molecular weight polyethylene (UHMW-PE) of ASTM Standard cutting edge for ploughs / blades on experimental basis so as to avoid injury / damage to road surface. The metallic scrapper / cutting edge of the snow plow in contact with the road due to some undulation/uneven surface may result in damage to the black top. Damages to roads during snow clearance needs appropriate redressal by replacement of the steel cutting edge by a compliant material with good

mechanical properties viz. hardness, elasticity, tensile and tear strength. There are such plastic/rubber materials available in global market and used by leading brands in snow equipments manufacturing viz Aebi Schmicdt, Zaugg, Mercedes Benz etc. the search for such affordable matching indigenously available materials has been sourced out in the shape of Ultra High Molecular Weight Polyethylene (UHMW-PE) and Polyethylene and the same are being put to a trial run this winter. The advantages of using UHMW-PE and Polyethylene over steel are enumerated as under:

- It provides better abrasion resistance than rubber and steel,
- It is elastic material that absorbs impact and conform to the surface being plowed rather than damaging the plowing surface, making it the ideal choice for use on concrete, parking garages, brick, pavers, cobble stone or any other uneven surface,
- This material reduces drive fatigue and equipment wear by minimizing blade and equipment vibration, and
- Least noisy in operation making it ideal in use in residential areas and hospitals.

During current year around 60 machines have been planned to be provided with molecular plastic cutting edge to ascertain its performance. In case, found feasible, the proposal for providing such attachment to entire machinery would be framed alongwith financial implications. As reported by Chief Engineer, Mechanical Engineering Department, Kashmir, the cost for providing such molecular plastic cutting edge is approximately Rs. 15000 per unit, however, at least three spare cutting edge blades as replacements are required with each machine for the current season, as these are susceptible to maximum wear and tear during operation.

6. Annual Repair and Macadamization of R&B Department:

- (a) The macadamization of roads is undertaken annually by R&B Department for providing smooth road surface for safety of commuters. Normally, the roads for which macadamization has not been done during last 3-5 years are taken up for renewal coats. The macadamization in UT of J&K is mainly done by way of providing 50mm thick bituminous macadam and 25mm thick semi-dense. The renewal coat is carried out by way of 25mm / 30mm SDBC. The achievements of macadamization of roads under all sectors for last 03 years is given hereunder:-

Bituminous Road Length Achievement in J&K

S.No	Year	(In Kms)
1	2018-19	2074
2	2019-20	2289
3	2020-21	5032
4	2021-22 (ending Nov-21)	4574

- (b) 15% of the road length under all sectors is macadamized annually thus leaving substantial road length for macadamization in forthcoming years, in piece-meals, as per the availability of funds. This road length subjected to constant wear and tear with vagaries of weather is mostly susceptible to damage during snow clearance.
- (c) **Specification / Thickness of BT surface used by various agencies:**

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The specifications / Thickness of BT surface of National Highways under NHAI / NHIDCL / BRO vary with respect to the specifications adopted by J&K, as per the following details. The specifications of NHAI / NHIDCL / BRO are much richer than existing in J&K.

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Specification of BT works by various agencies in J&K

S.No.	Agency	Jammu / Kashmir	Avg. Cost per Km for single lane
1.	PW(R&B) Department	50mm BM and 25mm SDBC	26.0 lacs
2.	NHAI / NHIDCL	90mm DBM and 50mm BC	50.0 lacs
3.	BRO	75mm DBM and 40mm BC	43.50 lacs

7. Resource availability for snow clearance:

During past many years, the resources under snow clearance have been available adequately. Moreover, very harsh winters wherein 7 to 9 falls were recorded with maximum snow depth of 72 inches in residential areas have been experienced. The resources for snow clearance and machinery for snow clearance needs to be augmented annually especially for higher snow depth and increase in road lengths every year for smooth and quick snow clearance operation with minimum damage to road surface. Department wise release of funds for snow clearance for last 3 years along-with the road lengths cleared is given as under:-

Year wise resource availability for snow clearance in J&K

(Figure in Crore Rupees)

HOD	Allocation 2017-18	Kms cleared	Allocation 2018-19	Kms cleared	Allocation 2019-20	Kms cleared	Allocation 2020-21	Kms cleared	Allocation 2021-22	Kms to be cleared
MED Kashmir	200	7577	500	7865	835	7984	600	8571	620	8663
R&B Kashmir	900	7229	500	7703	600 + 899 -for liabilities	8001	700	8036	750	7611
PMGSY Kashmir	110	931	110	1140	82.50	1294	150	1190	175.0	1433

MED Jammu	30	1434	55	1410	30	2387	40	2060	40	2250
R&B Jammu	50	771	50	1121	95	875	150	982	160	1042
PMGSY Jammu	300	1600	300	1685	565	1985	450	2095	500	1758
Total*	1590	19542	1515	20924	3106.5	22526	2090	22934	2245	22757

*many a times same road is cleared again and again during one snowfall, therefore, Kms are dynamic and not absolute.

8. Gap Analysis : Machinery and Resources

Appropriate machinery with skilled operation not only enhances efficiency and satisfactory levels of service but also reduces stress on maintenance. Statistics reveal that the resources spent on operations with appropriate use of machinery with high capital cost is surely to result in savings on resources induced to be pumped for post operation damages.

Requirement for snow clearance with present man-power / machinery / methods

Department	Roads Assigned (in Kms)	Requirement		Availability		Deficit	
		Machinery	Manpower (Skilled Operators)	Machinery	Manpower (Skilled Operators)	Machinery	Manpower (Skilled Operators)
MED Kashmir	8663	407	699	210	305	197	394
R&B Kashmir	7611	380 JCBs / Tractors (Through Contracting agencies). Or Snow Clearance Machinery: 272 No.	Nil Or 544 No.	JCBs / Tractors : 380 No. (Through Contracting agencies). Nil	(Available through contracting agencies) Nil	Snow Clearance Machinery: 272 No.	544 No.

PMGSY Kashmir	1433	85 JCBs / Tractors (Through Contracting agencies). Or Snow Clearance Machinery: 51 No.	Nil Or 102 No	JCBs / Tractors : 85 No. (Through Contracting agencies). Nil	(Available through contracting agencies) Nil	Snow Clearance Machinery: 51 No.	102 No.
MED Jammu	2250	120	240	44	88	76	152 No.
R&B Jammu	1285	85 JCBs / Tractors (Through Contracting agencies). Or Snow Clearance Machinery: 46 No.	Nil Or 92 No	JCBs / Tractors : 85 No. (Through Contracting agencies). Nil	(Available through contracting agencies) Nil	Snow Clearance Machinery: 46 No.	92 No.
PMGSY Jammu	1758	138 JCBs / Tractors (Through Contracting agencies). Or Snow Clearance Machinery: 63 No.	Nil Or 126 No	JCBs / Tractors : 138 No. (Through Contracting agencies). Nil	Available through contracting agencies) Nil	Snow Clearance Machinery: 63 No.	126 No.
Total:		959	1803	254	393	705	1410

As per above statement, the requirement of machines for entire road length is 959 numbers out of which only 254 are available with MED Kashmir / Jammu at present, which caters for clearance of 9705 km of road length out of 21798 km. The remaining road length of 12093km is presently being done through contracting agencies by R&B and PMGSY in both Jammu and Kashmir provinces, for which the appropriate snow clearance machinery is proposed.

9. SOR Analysis:

In J&K Schedule of Rates 2020, the rate of clearing snow from roads is given manually only, using picks and shovels. The labours during snowfall are rarely available and thus the clearance by contracting agencies is mostly done through available machinery in market, i.e., JCBs and Tractors, for which attachments are recommended to safeguard roads from damages. The rate of snow clearance through machinery is required to be incorporated in Schedule of Rates, as per norms of MoRTH and BRO. DIQC needs to analyze and finalize rate, applicable to the terrain of Union Territory of J&K. Addendum to Schedule of Rates 2020 need to be issued by DIQC Department in this regard, at an earliest.

The issue of snow clearance was also taken up with Uttarakhand state authorities who informed that the snow clearance is done by the engagement of JCBs at hire charges of Rs. 950 per hour, without any established schedule. They have further informed that higher reaches of roads in Uttarakhand as well as in Himachal Pradesh are cleared by Border Roads Organization (BRO).

S.NO	Agency	Items	
		Clearing of snow (without frost) from roads, manually, over 250mm but upto 350mm depth	Clearing of snow with machinery
1.	J&K SoR 2020	Rs. 2.25 per sqm which works out to Rs. 7.50 per cum	
2.	MED	-	Rs. 10,400/- per Km per Season for operation cost only (Fuel and Machine Maintenance)

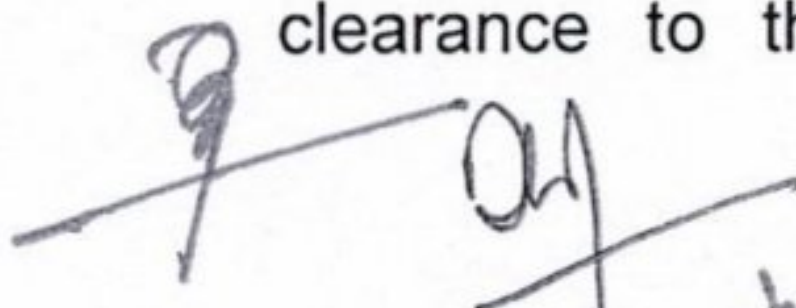
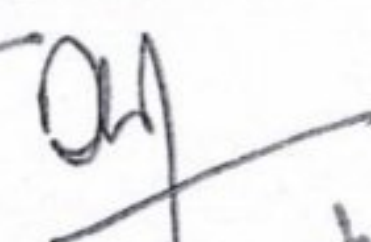

3.	BRO	-	Rs. 40 per cum for single lane and Rs. 60 per cum for double lane (as per BRO Rate structure of 2017) conveyed by BRO Hqr. (Appendix "B" to letter No. 21801/Policy/DGBR/84/TP(Central) dated 16.08.2017.
4.	Uttarakhand State	-	Engagement of JCBs at Rs. 950 per hour.

10. Recommendations:

Based on analysis of various aspects of road maintenance, repair, macadamization, bitumen thickness / specification, SOR provision at present in J&K and various factors for damage to roads during snow and other factors, following recommendations are made:-

- i. The clearance operation to begin only after the depth of the accumulated snow on road surface is 100mm (4") and ensure vehicle blades are kept 50mm (2") above the black topped surface to avoid damage to the road surface.
- ii. Sprinkling of salt over frosted road surfaces to be carried out. The salt helps in melting ice and provides more traction to vehicles. The item to be incorporated in J&K SoR 2020 by DIQC Department on the basis of proper analysis.
- iii. The roof tops slipping directly along city / town roads heaps up in dense mounds of snow not cleared by usual fleets of snow clearance machines and result in blockage and delay in clearance. The municipal / urban bodies need to urge public for installation for snow stoppers on rooftops to avoid snow mounds on roads.
- iv. Snow clearance with conventional attachment of backhoe loaders, i.e., JCB or even with crawling type tracked machines viz. dozers result in damage to the road surface and thus may be avoided for snow clearance to the extent possible by providing adequate number

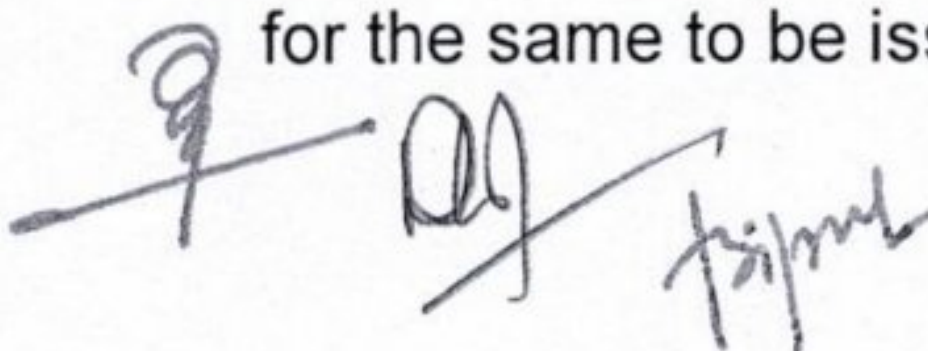
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required and suitable snow clearance machines to every district which experiences snowfall, both in Kashmir and Jammu divisions.

- v. In case the damage to road surface after snowfall is attributed to poor execution of macadamization work rather than snow clearance operation, the DLP Clause to be enforced, rigorously and religiously. Pre snow and post snowfall videos and pics to be uploaded by all Divisions in snow bound areas on JKPWDOMS.
- vi. The contracting agencies shall also be made responsible for the rectification of damages, if any, due to their negligence or ill equipped machinery for which suitable conditions shall be incorporated in the tender document and agreement for the work. SoR to have mention for rectification provision while analyzing the rate for snow clearance.
- vii. Suitable attachments to the snow clearance machinery of contracting agencies to be provided to all R&B Divisions. Initially 5 attachments be provided to each Division, Town Area Committee's and 10 attachments to Srinagar Municipal Corporation through Mechanical Engineering Department, Kashmir.
- viii. In case the performance of ultra high density molecular plastic cutting edge for ploughs / blades is found satisfactory, the same be provided to the entire machinery. The cost of high molecular plastic cutting edge works out to Rs. 15000 per machine. Three spares for each machine would be required during season.
- ix. Snow Clearance Operation with suitable machines and blade attachments need to be incorporated in the 'Schedule of Rates' by DIQC Department in consultation with the Chief Engineer, Mechanical Engineering Department, Kashmir / Jammu. The snow clearance item already provided in SoR 2020 also needs to be re-analyzed to arrive at a correct rate after analyzing MoRTH and BRO rates. The addendum for the same to be issued by DIQC at an earliest.

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- x. Regular Training and Skill Development to be imparted to the operational staff of Snow clearance operations.
- xi. Private Players with appropriate machines to be empanelled for snow clearance operations. The venture can be considered to be made attractive with incentives like long term contract for 10-15 years. The rates for the snow clearance items can be based on analysis of rates as per MoRTH/ BRO with admissible escalation on machinery as well as labour. The J&K SoR shall be directly linked with the Standard Data Book for analysis of rates by MoRTH/ BRO for this purpose. Vendors would be required to deploy his / her own manpower / machinery for the purpose in which minimum length / Km to be assured for a long term, so that it becomes investment attractive, for which he can avail incentives from I&C Department schemes.
- xii. The contracting agencies / unemployed youth be incentivized under credit linked schemes of Industries and Commerce Department, Labour and Employment Department and Tourism Department for procurement of suitable machinery under technical supervision of Mechanical Engineering Department for investing in procurement of snow clearance attachments / molecular plastic blades / tractor 150 BHP / JCBs with attachments. Industries and Commerce Department to also examine institutional funding for procurement of machines / attachments.

xiii. **Long Term Measures**

Newly fabricated attachment and use of ultra high density molecular polyethylene cutting edge are not a long term and permanent solution for minimum damage to the road surface. The committee recommends for use of technically approved machinery only to be used for snow clearance of roads as snow is an annual feature in J&K. Every year R&B Department is spending more than Rs. 500 crores on macadamization of roads. If usual damage to roads leads to reduction

of road surface life by 10% every year on R&B specification roads, it is worth-while to invest Rs. 500 crore in procurement of technically appropriate machinery for snow clearance to minimize damage to the road surface. Present length of road surface is not a constant figure but is marching ahead and adding more Kms of length every year. Following is the recommendation for machines which can be procured in next two to three financial years for snow clearance of all major / internal roads of UT of J&K.

Details of snow clearance machinery required in J&K

S.No	Description	Unit	Quantity Required		Total	Rate (in Lacs)	Amount (in Lacs)
			MED/R&B/PMGSY Kashmir	MED/R&B/PMGSY Jammu			
1	Snow Plough Truck (Ashoka Leyland/Tata)	No.	185	49	234	40	9360
2	Snow Plough with Tractor	No.	275	101	376	20	7520
3	Snow Cutters (Rolba/Schimdt/Fresia)	No.	11	8	19	550	10450
4	Unimog (Mercedes Benz) with variable Snow plough and blower	No.	20	7	27	400	10800
5	Backhoe loader/Front End Loader	No.	20	8	28	100	2800
6	Dozer D50	No.	9	1	10	105	1050
7	Snow Blower	No.	0	11	11	55	605
8	Front End loader Blade Mounted	No.	35	28	63	110	6930
			555	213	Total		49515

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xiv. **Short Term Measures:**

a. Attachment for JCBs and Tractors:

Supply of fixed wedge plough for backhoe loaders along with 5 sets of EN8 carbon steel grade cutting edge plank and 5 sets of ultra high molecular weight polyethylene (UHMW-PE) of ASTM standard cutting edge and other accessories viz. Hex head straight fastener bolts with nuts, washers, spacers.

5 per Division for 65 Divisions of R&B and PMGSY
in Kashmir and Jammu region @ 2.50 lacs per machine = 1625.00 lacs

Srinagar Municipal Corporation, 10 No. @ 2.50 lacs = 25.00 lacs

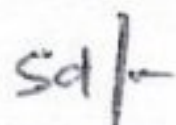
Town area Committees, 12 No. (5 attachments
each) @ 2.50 lacs = 150.00 lacs

Total: 1800.00 lacs

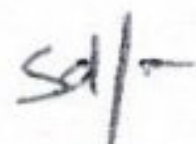
b. Ultra High Density Molecular Cutting edge
for 217 machines @ Rs. 45000 per machine for
three spares = Rs.97.65 lacs

Grand Total: = Rs. 19.00 Crore

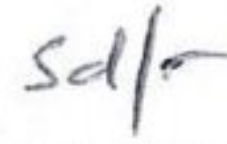
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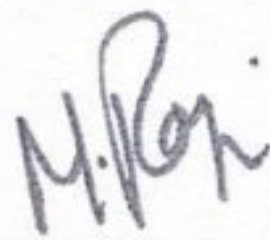
(Rafiq A. Rafiq)
Chief Engineer
PW (R&B) Dept., Kashmir



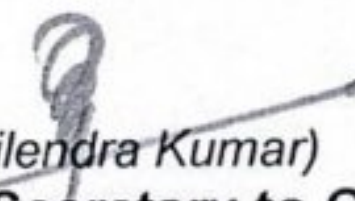
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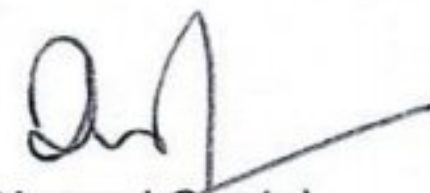
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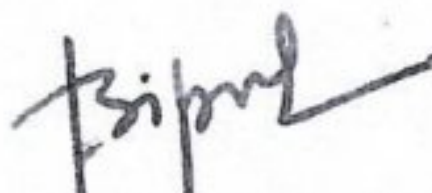
(M. Raju)
Commr. / Secretary to Govt.
Jal Shakti Department, J&K



(Shailendra Kumar)
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PW (R&B) Department, J&K



(Dheeraj Gupta)
Principal Secretary to Govt.
H&UD Department, J&K



(Bipul Pathak)
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RD & PR Department, J&K

xiv. Short Term Measures:a. Attachment for JCBs and Tractors:

Supply of fixed wedge plough for backhoe loaders along with 5 sets of EN8 carbon steel grade cutting edge plank and 5 sets of ultra high molecular weight polyethylene (UHMW-PE) of ASTM standard cutting edge and other accessories viz. Hex head straight fastener bolts with nuts, washers, spacers.

5 per Division for 65 Divisions of R&B and PMGSY
in Kashmir and Jammu region @ 2.50 lacs per machine = 1625.00 lacs

Srinagar Municipal Corporation, 10 No. @ 2.50 lacs = 25.00 lacs

Town area Committees, 12 No. (5 attachments
each) @ 2.50 lacs = 150.00 lacs

Total: 1800.00 lacs

b. Ultra High Density Molecular Cutting edge
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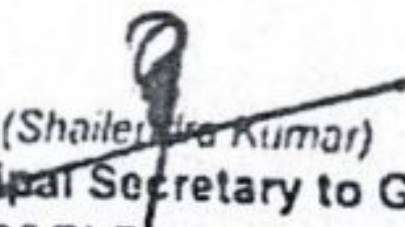
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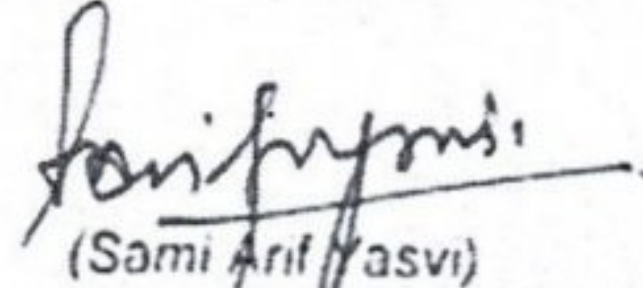
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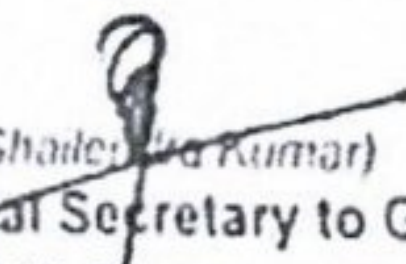
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