

## INVENTORY CONTROL OF TYRES TUBES & BATTERIES (TTB) AND LUBRICANTS OF VEH/EQPT/ PLANTS: A PRACTICAL APPROACH FOR ALL USER UNITS OF BORDER ROADS ORGANISATION

*R K Singh*

*Research Scholar, Tanta University, Sri Ganganagar, Rajasthan, India*

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### **ABSTRACT**

*The Border Roads Organisation (BRO) develops and maintains road networks in India's border areas and friendly neighboring countries. BRO operates in 19 states and three UTs (Andaman and Nicobar Islands, J&K and Laddakh), and neighboring countries such as Afghanistan, Bhutan, Myanmar, and Sri Lanka. BRO operates and maintains over 32,885 kilometers of roads and about 12,200 meters of permanent bridges in the country. The BRO operates through 18 Projects namely : Arunank, Beacon, Brahmank, Chetak, Deepak, Dantak, Himank, HIRAK, Pushpak, Sampark, Setuk, Sewak, Shivalik, Swastik, Udayak, Vartak, Vijayak and Rohtang Tunnel. BRO is instrumental in significantly upgrading and building new Indo-China Border Roads. This is only organization in India, working with own expertise and machineries. All development activities are being done by various modern and advanced Vehicle/ Eqpt / Plants. Their needs of Tyres, Tubes and Batteries etc and lubricants and its periodical change with new one is a challenging job for all user units. Hence a dedicated and practical approach is needed to overcome these works to avoid idling due to this. It also ensures optimal availability of equipment for actual job on ground. Therefore, this study is done after a detailed analysis and taking feedback from staff working on ground. This enables user to stock optimal quantity of TTB and lubricants to avoid deterioration in store and at the same time to fulfill requirement on ground. There is a huge saving on blockage of cost of inventories.*

**KEYWORDS:** *Vehicle/Eqpt/Plants, Inventory Control, Commonality, Field Workshop, Base Workshop, Preventive Repair & Maintenance, Tyres, Tubes & Batteries and Lubricants Etc*

### **INTRODUCTION**

Border Roads Organisation is an infrastructure development organisation working under the ministry of defence. The capital cost of Vehicle/Equipment/Plants is about Rs 4500 Crs. There are a fleet of about 480 types of various vehicles and equipments/plants and total population is about 17000. Inventory management of Tyres, Tubes & Batteries (TTB) and Lubricants is a critical function for Border Roads Organisation. Without effective and efficient control methods, the supply chain suffers. But choosing the right method for practical inventory control and developing effective methods to ensure that processes are followed. To improve the accuracy of your inventory control methods and collecting accurate data to understand the needs on ground. A dedicated approach for user units including Field Workshops and Base Workshops level is worked out, which covers almost 90 % of population. There are various types of lubricants from various firms/OEM have been recommended for use on veh/eqpt/plants. This leads a very large number of lubricants to be stocked

on ground. Therefore this study has been taken and a optimum list is finalised. Similarly, there are various sizes of TTB have been recommended by OEMs of different veh/eqpt/plants. This study concludes the finalisation of commonality and a optimum list of TTB, which reduces the burden of users.

## Background

It was a need felt to make an easy and efficient inventory management of tyres, tubes & batteries. Accordingly, a practical approach to overcome day to day crisis on ground have been analysed and summarised below. For this, various study of existing procedures, army workshops, discussion with officers and staff working on ground have been done since last one year and then a final shape of this paper have been made. This needs further shaping w.r.t time in the future. The details of fleets of veh / Eqpt / Plant held in BRO are depicted in Table 1.

**Table 1: List of Veh/Eqpt/Plants Held on Maintenance Load of Field Workshops & Base Workshops: Bro**

Sr No.	Model of Veh/Eqpt/Plants	Make & Model of Engine	Name of OEM
1	Dragline 101 ME	Cummins 6CTA 8.3C	M/s Titagarh Wagons Ltd
2	Dozer BD50 A15	BEML BS-6D105-I	M/s BEML Ltd
3	Dozer D-155 A-1	Cummins 6 Cyl Diesel Engine	M/s BEML Ltd
4	Dozer D80 A12	BEML BS-6D125-I	M/s BEML Ltd
5	Hyd Exc BE -220	BEML BS-6D105-I	M/s BEML Ltd
6	Hyd Exc BE- 75	Kirloskar 4R-1040	M/s BEML Ltd
7	Motor Grader BG-605	BEML BS-6D125-I	M/s BEML Ltd
8	JCB Excav cum Loader 3DX Super/4DX	JCB 444 TC -68	M/s JCB India Ltd
9	JCB Excav 3DX	Kirloskar RB-44	M/s JCB India Ltd
10	JCB Hyd Excav JS- 80	Kirloskar 4R 1040	M/s JCB India Ltd
11	JCB Hyd Excav JS 200	Tata Cummins 6BT	M/s JCB India Ltd
12	JCB Wheel Loader- 430Z	ALU 411 TC2/1	M/s JCB India Ltd
13	Telcon Hitachi Hyd Excav EX70	Tata 497 NA	M/s Telcon Ltd
14	Telcon Hitachi Excav cum Loader JD315 SE(T)	Tata 497 TC-91	M/s Telcon Ltd
15	Telcon Hitachi Excav cum Loader JD 315V	Tata 497 TCIC BS-III	M/s Telcon Ltd
16	Telcon Hitachi Hyd Excav EX200	Tata Cummins 6BT	M/s Telcon Ltd
17	Telcon W/Loader Model-3036	Tata 697 TC	M/s Telcon Ltd
18	Escorts Soil Compactor Model- 5250	Kirloskar HA-694	M/s Escort Construction Eqpt Ltd
19	L&T Soil Compactor Model 1107D	Kirloskar HA 694	M/s L&T Case India Ltd
20	Bomang Greaves Soil Compactor	Kirloskar HA 694	M/s Bomang Greaves India Ltd
21	L&T Mini TVRR Model- 450	M&M 4cyl Eng	M/s L&T Case India Ltd
22	L&T Vibrator RR Model-752	Kirloskar HA 694	M/s L&T Case India Ltd
23	Ingersol Rand Vib Road Roller	Kirloskar HA 694	M/s Ingersol Rand Ltd
24	Escort TVRR HD- 85	Kirloskar HA-694	M/s Escort Construction Eqpt Ltd.
25	Road Roller Jessop	S-4	M/s Jessop India Ltd
26	Road Roller BM	S-4	M/s Britannia Eng Co., Ltd.
27	Road Roller Speed craft	S-4	M/s Speed Craft India Ltd
28	Road Roller Wilson	S-4	M/s Wilson India Ltd
29	Paver Finisher AP550DX	Kirloskar 6R1080	M/s Apollo India Ltd
30	Paver Finisher RM-6 Apollo	Kirloskar 4R-1040	M/s Apollo India Ltd
31	Farm Tractor Holland 3630	IVECO8000 Series 3cyl	M/s New Holland Ltd
32	Farm Tractor 6065 Escort	Escort 4CYL S2216 W/Cooled	M/s Escort Construction Eqpt Ltd.
33	Air Comp 140 CFM	M&M 1189	M/s Cps/Atlas Copco Ltd

34	Air Comp Cps 260 CFM	P-6 -354	M/s Cps/Atlas Copco Ltd
35	Air Comp Cps 260 CFM	Hino ALU W 04D	M/s Cps/Atlas Copco Ltd
36	Air Comp 300 To 372 CFM	Hino ALU W 04D	M/s Cps/Atlas Copco Ltd
37	Gen Set 5.5 KVA, Greaves	Greaves Eng MK-3	M/s Greaves India Ltd
38	Gen Set 5.5 KVA, Greaves	Greaves G600W	M/s Greaves India Ltd
39	Gen Set 11.25 KVA Kirloskar	Kirloskar HA 394	M/s Kirloskar India Ltd
40	Gen Set 11.25 KVA	Ruston 3 YWA	Ruston & Hornsby (India) Ltd.
41	Gen Set 11.25 KVA	HA 294 Eng	M/s Kirloskar India Ltd
42	Gen Set 11.25 KVA	Kirloskar EW24 Eng	M/s Kirloskar India Ltd
43	Gen Set 11.25 KVA	Greaves 3YWA MK-V	M/s Greaves India Ltd
44	Gen Set 11.25 KVA Atul	4 Cyl W/Cooled Atul	M/s Atul Gen Set India Ltd
45	Gen Set 11.25 KVA Kirloskar	Kirlosker HA 494 Eng	M/s Kirloskar India td
46	Gen Set 15 KVA Elmech Kirloskar	Kirlosker HA 294 Eng	M/s Elmech Kirloskar India Ltd
47	Gen Set 30 KVA	Greaves 3YAK MK6	M/s Ph Greaves Ltd
48	Gen Set 30 KVA Kirloskar Green	Kirlosker HA 494 Eng	M/s Kirloskar India Ltd
49	Gen Set 30 KVA Tata Rishabh Green	Tata 497 SPTC 78	M/s Tata Rishabh India Ltd
50	Gen Set 62.5 KVA Kirloskar Green	Kirloskar 4R1040T eng	M/s Kirloskar India Ltd
51	Gen Set 160 KVA Greaves	Greavs TBD-232 V-8 Eng	M/s Greaves India Ltd
52	Escort Crane F14	Kirloskar 4R-1040	M/s Escort Construction Eqpt Ltd
53	Car Ambassador Nova	MPFI 1800 BS-II ISZ	M/s Hindustan Motors Ltd.
54	Maruti Ciaz Car	K14BVVT 1373CC 4 Cyl	M/s Maruti Udyog Ltd.
55	Tata 410 Ambulance	Tata 497 SPTC BS-III	M/s Tata Motors Ltd
56	Maruti Gypsy 410	MG 410	M/s Maruti Udyog Ltd.
57	Maruti Gypsy King	M/King 1.3 Ltr MPFI	M/s Maruti Udyog Ltd.
58	Tata Safari 2.2VTT	2.2VTT, Dicor BS-IV	M/s Tata Motors Ltd
59	Mahindra Bolero DI4WD	Mahindra 2523CC,TC	M/s M&M Ltd.
60	Mahindra Scorpio	M&M 2.2 Hawk BS-IV	M/s M&M Ltd.
61	Mahindra Bolero Camper	Mahindra Bolero Camper BS-IV	M/s M&M Ltd.
62	Swaraj Mazda Bus	SLTC T-3500	M/s Swaraj Mazda Ltd.
63	Tata 709 Bus	Tata 497 SPTC BS-II	M/s Tata Motors Ltd
64	Tata 712 Bus	Tata 497 SPTC BS-III	M/s Tata Motors Ltd
65	Tata 1510 Bus 52 Seater	Tata 697 TCIC 56	M/s Tata Motors Ltd
66	Tata Mobile – 207	483 DL TC-50 BS-II	M/s Tata Motors Ltd
67	Tata Mobile -207	483 DL TC-55 BS-III	M/s Tata Motors Ltd
68	Tata Xenon BS-IV	Dicor3L (4SPCR)	M/s Tata Motors Ltd
69	Tata 407 (4x2)	Tata 497 SP 21	M/s Tata Motors Ltd
70	Tata 407 TC	Tata 497 SPTC	M/s Tata Motors Ltd
71	Tata 407 TC IC	Tata 497 TC IC BS-III	M/s Tata Motors Ltd
72	Tata Water Truck 1613 SE (4x2)	Tata 697 TC BS-II	M/s Tata Motors Ltd
73	Tata Water Truck 1615 SE (4x2)	Tata 697 TC BS-III	M/s Tata Motors Ltd
74	Tata Water Truck 1613 SE (4x2)	6BT Cummins II	M/s Tata Motors Ltd
75	Tata L/C 1613 SE (4x2)	697 TCIC BS-II	M/s Tata Motors Ltd
76	Tata L/C 1613 SE (4x2)	6BT Cummins BS-II	M/s Tata Motors Ltd
77	Tata L/C 1212 TC/42 (4x4)	6BT Cummins BS-III	M/s Tata Motors Ltd
78	Tata TLR 2515 LPT (6x2)	6BT Cummins BS-II	M/s Tata Motors Ltd
79	Tata REC Veh 1212 TC	6BT Cummins	M/s Tata Motors Ltd
80	Tata Recovery Veh 1210	697 D21/24	M/s Tata Motors Ltd
81	Tata Troops carrier	Tata 697 TC IC BS-III	M/s Tata Motors Ltd
82	Tata Tpr SK 1613	Tata 697 TC IC BS-II	M/s Tata Motors Ltd
83	Tata Tpr 1212 SAK TC (4x4)	6BT Cummins BS-II	M/s Tata Motors Ltd
84	Tata Tpr 1212 SAK TC (4x4)	6BT Cummins BS-III	M/s Tata Motors Ltd

85	Ashok Leyland L/Carrier 1616	HA6ETI3KN BS-III	M/s Ashok Leyland Ltd.
86	Ashok Leyland Dumper 2516/2	AL-HA6DT12N	M/s Ashok Leyland Ltd.
87	Ashok Leyland Tipper 1616	HA6ETI3KN BS-III	M/s Ashok Leyland Ltd.
88	Ashok Leyland Recovery Stallion	HA6ETI3KN BS-III	M/s Ashok Leyland Ltd.
89	Mahindra Toro Dumper	M Power 6.12 TCA	M/s M&M Ltd.
90	AMW Dumper 2523	Cummins 6BT	M/s AMW Ltd.
91	Tata 3 Axle Dozer Transporter	Cummins 6BT	M/s Tata Motors Ltd.
92	AMW 3 Axle Dozer Transporter 2518	Cummins 6BT	M/s AMW Ltd.
93	Tata 3 Axle Dozer Transporter BS-IV	Cummins 6BT BS IV	M/s Tata Motors Ltd.

### Classification of Items/ Spares Required for Repair and Maintenance of Veh/Equip/Plants are Depicted as Under:

Vehicles/Equipments/Plants inducted in Border Roads Organization are listed at table 1 above. Their original manufacturer has been mentioned. Accordingly every Vehicles/Equipment/ Plants are needing two types of items, which are required day to day for keeping them mechanically healthy.

- **Category 'A' Spares:** These items are spares which are having Cat 'A' part number as per OEM recommendations. For example Engine assay, all Filters Clutch plate, Master cylinder, Leafs and Axle bearing etc. These have already been covered in previous two articles.
- **Cat 'B' Items:** These items are covered under those items which are left after considering Cat 'A' spares. For Example Tyres, Battery, Battery lead, Rubber Beading, upholstery items and lubricants etc. These are not having manufacturer part number in the literature. In this article Tyres, Tubes & Batteries and Lubricants are covered.

In this paper Tyres, Tubes & Batteries and Lubricants are being studied for easy and efficient planning, provisioning & monitoring/controlling of their requirement as per user.

**Application and Suitability:** On account of application and suitability of items, it is summarized and depicted as under:

**Table 2**

Sr. No.	Types of Items / Store	Table.
(a)	Tyres & Tubes	Table 2
(b)	Batteries	Table 3
(c)	Lubricants and periodicity	Table 4

**Table 3: Tyres and Tubes**

S/ No	Size of Tyre Originally Fitted in the Veh/Equip/Plants	Make & type of Veh/Equip/ Plants	Original Manufacturer of Veh/Equip/Plants	Number of Tyres Per Veh/Equip/Plants	Size of Tyre Recommended for Use
01.	23.1-26R 37R-390 Tubeless	Soil Compactor EC 5250	M/s Escort Const Eqpt Ltd.	2	23.1-26R 37R-390
		L&T Soil Compactor Model-1107D	M/s L&T Case India Ltd.	2	
		Bomag Greaves Soil Compactor	M/s Greaves India Ltd	2	
02.	16.9 x 30	Farm Tractor 6065 Escort	M/s Escort Const Eqpt Ltd.	2 (Rear)	16.9 x 30

03.	16.9 x 28	JCB Exc Cum loader 3DX Super /HMT Tractor 5911	M/s JCB India Ltd.	2 (Rear)	16.9 x 28
		Farm Tractor Holland 3630	M/s New Holland Ltd.	2 (Rear)	
04.	1400x25	Telcon Hitachi Exc cum Loader JD 315V/SE	M/S Telecon Ltd.	2 (rear)	1400x25
		JCB Wheel Loader 430Z	M/s JCB India Ltd.	4	
		JCB Exc Cum loader JCB 3DX (Rear)	M/s JCB India Ltd.	2 (rear)	
		Telcon Wheel Loader Model-3036	M/S Telecon Ltd.	4	
05.	1400 x 24	A/Leyland Recovery Stalin	M/s Ashok Leyland Ltd.	7	1400 x 20
06.	1300 x 24	BEML Motor Grader BG-605	M/s BEML Ltd.	6	1300 x 24
07.	11.20 x 24	Farm Tractor Escorts 6065 (Front)	M/s Escort Const Eqpt Ltd.	2 (Front)	11.20 x 24
08.	1000 x 20	Tata LC/Tpr/W/T/Recovery	M/s Tata Motors Ltd.	7	1000 x 20
		ALLC/Tpr/W/T/Recovery	M/s Ashok Leyland Ltd.	7	
		Tata Dumper	M/s Tata Motors Ltd.	7	
		A/L Dumper 2516	M/s Ashok Leyland Ltd.	7	
		Mahindra Torro Dumper 25	M/s Mahindra& Mahindra Ltd.	11	
		AMW Dumper 2523	M/s AMW Ltd.	11	
		Paver Finisher Apollo AP550DX/RM-6	M/s Apollo India Ltd.	04	
		3 Axle Dozer Transporter 2518	M/s AMW Ltd.	11	
		Tata 3 Axle Dozer Transporter	M/s Tata Motors Ltd.		
09.	900 x 20	A/L Load Carrier in old Model	M/s Ashok LeylandLtd.	7	
10.	900 x 16	Telcon Hitachi Exc cum Loader JD 315V/SE	M/s Telcon ltd.	2 (Front)	900 x 16
		Exc cum loader JCB 3DX	M/s JCB India Ltd.	2 (Front)	
11.	12.5/80-18	Exc cum loader JCB 3DX Super	M/s JCB India Ltd.	2 (Front)	12.5/80-18
12.	750 x 16	Farm Tractor Holland 3630	M/s New Holland	2 (Front)	750 x 16
	750 x 16	Bus (32 Seater) T-3500	M/s Swaraj Mazda Ltd.	5	
	750 x 16 825x16	Tata 407	M/s Tata Motors Ltd.	5	
13.	700 X16	Tata 207	M/s Tata Motors Ltd.	5	700 X16
14.	650 x 20	Farm Tractor HMT 5911 (Front)	M/s HMT Ltd.	2	650 x 20
15.	235/70R-16	Tata Safari 2.2VTT	M/s Tata Motors Ltd.	5	235/70R-16
16.	235/65R-17	Mahindra Scropio	M/s Mahindra& Mahindra Ltd.	5	235/65R-17

17.	215/75R-15	Mahindra Bolero	M/s Mahindra& Mahindra Ltd.	5	215/75R-15
	235/75R-15	Mahindra bolero Camper	M/s Mahindra& Mahindra Ltd.	5	
18.	2.75 x 18	Motor Cycle (rear)	M/s Hero Honda Ltd.	1	2.75 x 18
	2.75x16	Motor Cycle (front)	M/s Hero Honda Ltd.	1	
19.	215/75 R-16	T/Xenon BS-IV	M/s Tata Motors Ltd.	5	215/75 R-16
20.	195/80R-15(Radial)/ F78x15	Maruti Gypsy 410/King	M/s Maruti Udyog Ltd.	5	195/80R-15/ F78 x15
21.	185/65R-15	Maruti Car Ciaz	M/s Maruti Udyog Ltd.	5	185/65R-15
22.	165/80 R-15	Car Ambassador Nova	M/s Hindustan Motors Ltd.	5	165/80 R-15

#### Note

- Tubes of all Tyres will be provisioned alongwith tyres. Separate procurement/ stocking of Tubes are not recommended to avoid surplus stocking and fast deterioration wrt time in store.
- Flap-rust not to be provisioned as its FWT is very slow.

**Table 4: Batteries**

S / No	Type & Rating of Battery Recommended by the OEM	Type of Veh/Eqpt in this Type of Battery Suitable for	Original Manufacturer of Veh/Eqpt/Plants	Number of Battery Fitted Per V/E/Ps	Type & Rating of Battery Recommended by this Study
1.	12V32 AH	Maruti Car Ciaz	M/s Maruti Udyog Ltd.	1	12V 32AH
	12V 45AH	M/Gypsy King	M/s Maruti Udyog Ltd	1	
2.	12V75AH	Car Ambassador Nova	M/s Hindustan Motors Ltd.	1	12V80 AH
		Mahindra Scorpio	M/s Mahindra& Mahindra Ltd.	1	
	12V 70 AH	Mahindra Bolero	M/s Mahindra& Mahindra Ltd.	1	
	12V 75 AH	Mahindra Bolero camper	M/s Mahindra& Mahindra Ltd.	1	
	12V 75 AH	Tata 207	M/s Tata Motors Ltd.	1	
	12V75AH	Ashok Leyland Dumper 2516	M/s Ashok Leyland Ltd.	2	
	12V 75 AH	Tracked Excavator BE-75	M/s BEML Ltd.	2	
	12V88 AH	Tata Safari 2.2 VTT	M/s Tata Motors Ltd.	1	
		Tata 407	M/s Tata Motors Ltd.	1	
		AL W/Truck	M/s Ashok Leyland Ltd.	2	
Farm Tractor 6065 Escort		M/s Escort Const Eqpt Ltd.	1		
Farm Tractor Holland 3630		M/s Escort Const Eqpt Ltd.	1		

		Gen set 5.5 KVA	M/s Greaves India Ltd.	1	
		Gen Set 7.5 KVA	M/s Greaves India Ltd.	1	
	12V80 AH	Tata Xenon BS-IV	M/s Tata Motors Ltd.	1	
		Tata Mini Bus 709	M/s Tata Motors Ltd.	1	
		S/Mazda Mini Bus 32 Seater T3500	M/s Swaraj Mazda Ltd.	1	
		Conc Mixer Akona RD 15B	M/S Akona Ltd.	1	
		Excavator JS-80	M/s JCB India Ltd.	1	
	12 V 88 AH	AL W/Truck/ Tpr 1613	M/s A/Leyland Ltd.	2	
		Tracked Excvator EX 70	M/s Telcon ltd.	2	
	3.	12V88 AH	Mini TVRR 450	M/s L&T CaseLtd.	
12V 110AH		Gen Set 11.25KVA	M/s kirloskar India Ltd.	1	
12 V 95 AH		Gen Set 15 KVA	M/s kirloskar India Ltd.	1	
12 V 110 AH		Gen Set 30 KVA	M/s kirloskar India Ltd.	1	
12V100AH		Torro Dumper 25	M/s Mahindra& Mahindra Ltd.	2	
		Tata W/Truck 1613 BS-IV	M/s Tata Motors Ltd.	2	
12V 110AH		Tata LC/ W/Truck/ Tpr 1613 BS-III (Eng 697)	M/s Tata Motors Ltd.	2	
		AL LC/Tipper 1616 TC	M/s A/Leyland Ltd.	2	
		W/Loader 3036	M/s Telcon ltd.	2	
		W/Loader 430Z	M/s JCB India Ltd.	2	
		Tata W/Truck 1615 (Eng 697)	M/s Tata Motors Ltd.	2	
		AMW Dumper 2523	M/s AMW Ltd.	2	
4.		12V 130 AH	Tata 1212 /10613 Tpr (6BT) BS-III	M/s Tata Motors Ltd.	2
	Kir Gen Set 15 KVA		M/s kirloskar India	1	
	TVRR Escort HD 85		M/s Escort Const Eqpt Ltd.	1	
	12V135AH	Excvm cum loader 3DX/3DX Super	M/s Telcon Ltd.	1	
		Excvm cum loader 315 SE/V	M/s Telcon Ltd.	1	
		Tata LP 1510 Bus 52 Seater	M/s Tata Motors Ltd.	2	
		AL recovery Stalion	M/s A/Leyland Ltd.	2	
		Tracked Excavator EX 200LC	M/s Telcon Ltd.	2	
		Tracked Excavator BE220	M/s BEML Ltd.	2	
		Tracked Excavator JS 200	M/s JCB India Ltd.	2	

		Soil Compactor Greaves Bomang /PTRR	M/s Greaves India Ltd.	1	
		Soil Compactor 1107D/ Vib RR -752	M/s L&T Case Ltd.	1	
		Tata 3Axle Dozer Transporter (6BT)	M/s Tata Motors Ltd.	2	
		AMW 3Axle Dozer Transporter 2518 (6BT)	M/s AMW Ltd.	2	
		Tracked Excav JS-80	M/s JCB India Ltd.	1	
		Dozer BD 50	M/s BEML Ltd.	2	
5.	12 V 150 AH	Road Roller SC	M/s Speed Craft Ltd.	1	12 V 150 AH
		Road Roller Britaniya	M/s Britaniya Ltd.	1	
		Road Roller Joseph	M/s Joseph Ltd.	1	
		Welding Set	M/s Surarc Ltd.	1	
		62.5 Kva Gen Set	M/s Greaves India Ltd.	1	
		Tata LC/W/Truck 1212 BS-III (6BT)	M/s Tata Motors Ltd.	1	
	12V 180AH	Dozer BD80	M/s BEML Ltd.	2	
		Dozer BD155A1	M/s BEML Ltd.	2	
		Dragline 101 ME TWL	M/s Titagarh Wagons Ltd	2	
		Motor grader 605	M/s BEML Ltd.	2	
	12V 180AH	HMT Tractor 5911	M/s HMT Ltd.	1	
	12V 150 AH	Soil Comp EC 5250	M/s Escort Const Eqpt Ltd.	1	
	12 V 180 AH	Tata 1210 Recovery	M/s Tata Motors Ltd.	1	
		Tata LC/W/Truck/Tpr 1613 BS-II (Eng 697)	M/s Tata Motors Ltd.	1	
		Tata Tpr 1212 BS-II (6BT)	M/s Tata Motors Ltd.	1	
		Paver Finisher AP 550DX	M/s Apollo India Ltd.	1	
		BPD ATM 4000/1613	M/s Apollo India Ltd.	1	
	12 V 150 AH	Kir Gen Set 82.5 KVA	M/s Greaves India Ltd.	2	

#### Note

- Battery with minimum three years (36 months), warranty is recommended to be provision. It is to avoid premature failure of Batteries without completion of two year of life.
- Battery is recommended to be provision as per consumption data for six months to avoid the dead stock.



**Table 5: Commonality of Lubricants & Periodicity of Change**

S/No	Grade of Lubricant Recommended by Original Equipment Manufacturer	Make & Type of V/E/Ps	Assembly	Capacity	Periodicity of Change to be Considered	Grade of Lubricant Recommended in Bro
1.	SAE 15W40	Mahindra Bolero DI	Engine	7 Ltr	Range 9000 - 10000 Kms	IOCL Servo Pride Supreme 15W 40  HPCL HP Milcy No-1 Plus  BPCL Mak Platinum Plus 15W40
	SAE 20W40	Car Ambassador Nova	Engine	4.5Ltr	Range 9000 - 10000 Kms	
		Maruti Gypsy King 413	Engine	4.2 Ltrs	Range 9000 - 10000 Kms	
		Tata Mobile 207 DI BS II (497 SPTC)	Engine	7.7 Ltrs	Range 9000 - 10000 Kms	
		Tata 407 Turbo BS II	Engine	8 Ltr	Range 9000 - 10000 Kms	
		Tata Bus 709	Engine	8 Ltr	Range 9000 - 10000 Kms	
		Tata Tipper 1212 SA/SAK fitted with 6BT Engine	Engine	15.3 Ltr	Range 9000 - 10000 Kms	
		Tata Tipper 1613 SK/SE fitted with 697 TCIC Engine	Engine	14 Ltrs	Range 9000 - 10000 Kms	
		Ashok Leyland Tpr 1616 BS III	Engine	10.5 Ltr	Range 9000 - 10000 Kms	
		Ashok Leyland Dumper 2516	Engine	13 Ltrs	Range 9000 - 10000 Kms	
		AMW Dumper 2523	Engine	16 Ltrs	Range 9000 - 10000 Kms	
		M&M Dumper Torro 25	Engine	19.8 Ltrs	Range 9000 - 10000 Kms	

	Stallion Recovery 4x4	Engine	10.5 Ltrs	Range 9000 - 10000 Kms
	Tata Load Carrier 1212 SA/SAK fitted with 6BT Engine	Engine	15.3 Ltr	Range 17000 - 18000Kms
	Tata Load Carrier 1613 SK/SE fitted with 697 TCIC Engine	Engine	14 Ltrs	Range 17000 - 18000Kms
	Mini Bus Swaraj Mazda T-3500	Engine	8.5 Ltrs	Range 17000 - 18000Kms
	Mini Bus Tata LP 712 EX BS III fitted with 497 TCIC Engine	Engine	09 Ltrs	Range 17000 - 18000Kms
	Telcon Hitachi Hyd Excv EX 200	Engine	16.4 Ltr	Range 200-250 Hrs
	Hydraulic Excv JCB JS-200	Engine	14.2 Ltrs	Range 200-250 Hrs
	BEML Hyd Excavator BE-220	Engine	17.5 ltrs	Range 200-250 Hrs
	Hydraulic Excv Tata Hitachi EX 70	Engine	10 Ltr	Range 200-250 Hrs
	Hydraulic Excv JCB JS-80	Engine	14 Ltr	Range 200-250 Hrs
SAE 15W40	Hydraulic Excv BEML BE-75 fitted with Kir 4R1040	Engine	9.5 Ltr	Range 200-250 Hrs
	JCB -Wheel Loader 430Z	Engine	14.5 Ltr	Range 200-250 Hrs
	Telcom Hitachi Excavator cum loader 315V	Engine	9.5 Ltr	Range 200-250 Hrs
	Drag line 101 ME C-series engine	Engine	18.9	Range 200-250 Hrs
SAE 20W40	HMT Tractor 5911	Engine	12 Ltr	Range 200-250 Hrs
SAE 15W40	Motor Grader BEML 605	Engine	26 Ltr	Range 200-250 Hrs
	JCB 3DX Excavator loader	Engine	15 Ltr	Range 200-250 Hrs

	Dozer BD50 (With BEML BS 6D105-1)	Engine	24 Ltr	Range 200-250 Hrs
	Dozer BD80 With BEML BS6D125-1	Engine	32 Ltr	Range 200-250 Hrs
	BEML Wheel Loader	Engine	18 Ltr	Range 200-250 Hrs
	TVRR Escorts HD-85 & TVRR L&T-752 Engine Kirlosker HA 694	Engine	12 Ltr	Range 200-250 Hrs
	Mini TVRR L&T Case 450	Engine	11Ltr	Range 200-250 Hrs
	TVRR Greaves Bomang Greaves Engine Kirlosker HA 694	Engine	12 Ltr	Range 200-250 Hrs
	Soil Compactor Escort EC 5250	Engine	15 Ltr	Range 200-250 Hrs
	Soil Compactor L&T case 1107D	Engine	11 Ltr	Range 200-250 Hrs
	Soil Compactor Bumang Greaves	Engine	11 Ltr	Range 200-250 Hrs
	Air Comp XA 175 HDAtlas Copco	Engine	8.5 Ltrs	Range 200-250 Hrs
	Air Comp XAM 140 Atlas Copco(300 CFM)	Engine	8.5 Ltrs	Range 200-250 Hrs
	Air Comp XAS 76 Atlas Copco (140CFM)	Engine	8.5 Ltrs	Range 200-250 Hrs
	Air Comp CPS Chicago pneumatic (260 CFM)	Engine	9.5 ltrs	Range 200-250 Hrs
	Gen Set 11.25 KVA Kirloskar fitted with HA 294	Engine	5.5 Ltrs Max	Range 200-250 Hrs
	Gen Set 15 KVA Kirloskar fitted with HA 394	Engine	9 Ltrs Max	Range 200-250 Hrs
	Gen Set 30 KVA Kirloskar fitted with HA 494	Engine	10.5 Ltr Max	Range 200-250 Hrs
SAE 15W40	Stone Crusher Sisco	Engine	18 Ltr	Range 200-250 Hrs
	Stone Crusher marshal	Engine	18 Ltr	Range 200-250 Hrs

		Road Roller Static	Engine	17 Ltr	Range 200-250 Hrs	
		Paver Finisher SensorApollo AP550DX	Engine	15 Ltr	Range 200-250 Hrs	
		Paver Finisher Mechanical Apollo RM 6	Engine	15 Ltr	Range 200-250 Hrs	
		Water Pump	Engine	9 Ltr	Range 200-250 Hrs	
		Concrete Mixer (RD- 15B3 Akona	Engine	9 Ltr	Range 200-250 Hrs	
		Gen Set Kirlosker 125 KVA	Engine	16 Ltr	Range 200-250 Hrs	
		Gen Set 11.25KVA	Engine	5 Ltr	Range 200-250 Hrs	
		Concrete Mixer Universal RM-800	Engine	5 Ltr	Range 200-250 Hrs	
		JCB Wheel Loader 430Z	Gear Box	22 Ltrs	400 Hrs	
2	Servo Gear Super 80 W90	Car Ambassador Classic 1800 ISZ	Gear Box	1.6 Ltr	Range 14000- 15000 Kms	IOCL Servo Gear Super 80W90  HPCL Gear Oil XP 80W90  BPCL MAK Spirol HD 80W90
		Mini Bus Swaraj Mazda T-3500	Gear Box	4 Ltrs	Range 14000- 15000 Kms	
		Mini Bus Tata LP 712 EX BS III fitted with 497 TCIC Engine	Gear Box	5.2 Ltrs	Range 14000- 15000 Kms	
		Tata 407	Gear Box GBS 18	2.9 Ltrs	Range 19000- 20000 Kms	
		Tata 407	Gear Box GBS 27	3.2Ltrs	Range 19000- 20000 Kms	
		Tata Mobile 207 DI	Gear Box	1.6 Ltr	Range 19000- 20000 Kms	
		Maruti Gypsy King 413	Gear Box	1.3 Ltr	Range 23000- 24000 Kms	

	Mahindra Bolero DI4WD	Gear Box	2 Ltr	Range 23000-24000 Kms
	Tata Load Carrier 1212 SA/SAK fitted with 6BT Engine	Gear Box GBS 60	7.5 Ltr	Range 36000-40000 Kms
	Tata Tipper 1613 SK/SE fitted with 697 TC IC Engine	Gear Box GBS 40	6 Ltrs	Range 36000-40000 Kms
		Gear Box GBS-60	6.5 Ltrs	Range 36000-40000 Kms
		Gear Box GBS 40 (LC)	5.2 Ltrs	Range 36000-40000 Kms
	Stallion 4x4 Light Recovery Vehicle	Gear Box	6.5 Ltrs	Range 36000-40000 Kms
	AMW Dumper 2523	Gear Box	9.5 Ltr	Range 36000-40000 Kms
	M&M Dumper Torro 25	Gear Box	9.5 Ltr	Range 36000-40000 Kms
	SPM Rock Drill DC-122R	Transmission Oil	5 Ltr	500 Hrs
	Hydraulic Excv Tata Hitachi EX 200	Gear oil : Swing reduction device(front idler, swing device)	7.5 Ltr	Range 900-1000 Hrs
		Gear oil (Propel Travel reduction)	11 Ltrs	Range 900-1000 Hrs
	Hydraulic Excv JCB JS-200	Track Gear box	7 Ltrs	Range 900-1000 Hrs
		Slew Gearbox	5 Ltrs	Range 900-1000 Hrs
	Hydraulic Excv Tata Hitachi EX 70	Gear oil : Swing Reduction Gear/Device	1.8 Ltrs	Range 900-1000 Hrs

			Gear oil (Travel reduction Gear/device)	3.2 Ltr	Range 900-1000 Hrs
		Hyd Excav JCB JS-80	Transmission /Track gear box	7.8 Ltr	Range 900-1000 Hrs
			Prop Reduction Drive	5.5 Ltr	Range 900-1000 Hrs
		TVRR Escorts HD-85 Engine Kirlosker HA 694	Gear Oil (Drum & Differential)	10 Ltrs	Range 900-1000 Hrs
		Motor Grader BEML 605	Transmission Oil	36 Ltrs	Range 900-1000 Hrs
		Road Roller Static SC/Britaniya/Joseph	Transmission Oil	18 Ltrs	Range 900-1000 Hrs
		Tata Hitachi Excav cum Loader 315V	Transmission Oil	13 Ltrs	Range 900-1000
		Vib Road Roller Escort HD85	Gear Oil (Drum & Differential)	20 Ltrs	Range 1900-2000 Hrs
		VIB Road Roller Greaves Bomang Single drum wheel drive	Gear Oil (Drum & Differential)	11 Ltrs	Range 1900-2000 Hrs
		Vib Road Roller L&T 752	Gear Oil (Drum & Differential)	20 Ltrs	Range 1900-2000 Hrs
		JCB 3DX Super	Front Axle	17.6 Ltr	Range 900-1000
		Tata 407	Front Axle	2 Ltr	Range 19000-20000 Kms
		Tata Bus 709	Front Axle	4 Ltr	Range 19000-20000 Kms
		Stallion 4x4 Light Recovery Vehicle	Front Axle	13 Ltrs	Range 19000-20000 Kms
		Maruti Gypsy King 413	Front Axle	2.0 Ltr	Range 23000-24000 Kms
		Mahindra Bolero DI4WD	Front Axle	1.8 Ltrs	Range 29000-30000 Kms
		Mini Bus Swaraj Mazda T-3500	Rear Axle	3 Ltrs	Range 14000-15000 Kms

		Mini Bus Tata LP 712 EX BS III fitted with 497 TCIC Engine	Rear Axle	2.75 Ltrs	Range 14000-15000 Kms	
		Tata Mobile 207 DI	Rear axle	2.2 Ltr	Range 19000-20000 Kms	
		Tata Bus 709	Rear Axle	4 Ltr	Range 19000-20000 Kms	
		Tata 407	Rear Axle	2 Ltr	Range 19000-20000 Kms	
		Stallion 4x4 Light Recovery Vehicle	Rear Axle	13 Ltrs	Range 19000-20000 Kms	
		Maruti Gypsy King 413	Rear axle	1.5 Ltr	Range 23000-24000 Kms	
		Mahindra Bolero DI4WD	Rear axle	1.8 Ltrs	Range 29000-30000 Kms	
		Stallion 4x4 Light Recovery Vehicle	Auxy Gear Box	4.5 Ltrs	Range 19000-20000 Kms	
		Maruti Gypsy King 413	Aux Gear box	0.8 Ltr	23000-24000 Kms	
		Mahindra Bolero DI4WD	Aux Gear box	1.1 Ltr	Range 36000-40000 Kms	
		Tata Load Carrier 1212 SA/SAK fitted with 6BT Engine	Aux gear box	7.5 Ltr	Range 36000-40000 Kms	
		Car Ambassador Classic 1800 ISZ	Steering Gear Box	0.2 Ltrs	Range 36000-40000 Kms	
		Maruti Gypsy King 413	Steering Gear box	0.5 Ltr	Range 36000-40000 Kms	
3	SGS 85W140	Ashok Leyland Tpr 1616 BS III	Gear Box	7.5 Ltr	Range 36000-40000 Kms	IOCL Servo Gear Super 85W140

	Ashok Leyland Dumper 2516	Gear Box	7.5 Ltr	Range 36000-40000 Kms	HPCL HP Gear Oil XP 85W140  BPCL MAK Spirol HD 85W140
	Tata Load Carrier 1212 SA/SAK fitted with 6BT Engine	Front Axle	7.5 Ltrs	Range 36000-40000 Kms	
		Rear axle	7.5 Ltr	Range 36000-40000 Kms	
	Tata Load Carrier 1212 SA/SAK fitted with 6BT Engine	Front Axle	7.5 Ltrs	Range 36000-40000 Kms	
		Rear axle	7.5 Ltr	Range 36000-40000 Kms	
	Ashok Leyland Tpr 1616 BS III	Rear Axle	16.5 Ltrs	Range 36000-40000 Kms	
	Ashok Leyland Dumper 2516	Rear Axle (1 <sup>st</sup> Axle)	19 Ltrs	Range 36000-40000 Kms	
		Rear axle (2 <sup>nd</sup> Axle)	13.5 Ltrs	Range 36000-40000 Kms	
	AMW Dumper	Rear Axle (1 <sup>st</sup> Axle)	10 Ltrs	Range 36000-40000 Kms	
		Rear axle (2 <sup>nd</sup> Axle)	10 Ltrs	Range 36000-40000 Kms	
	M&M Dumper Torro 25	Rear Axle (1 <sup>st</sup> Axle)	17Ltrs	Range 36000-40000 Kms	
		Rear axle (2 <sup>nd</sup> Axle)	14.5 Ltrs	Range 36000-40000 Kms	
	JCB 430Z-Wheel Loader	Front axle	24.5 Ltrs	800 Hrs	
		Rear axle	24.5 Ltrs	800 Hrs	
	Paver Finisher SensorAP550DX/Mech Make Apollo RM6	Gear Box	40 Ltrs	1000 Hrs	



04	STF A	Tata Tpr/LC 1212 SA/SAK fitted with 6BT Engine	Power Steering	3 Ltr	72000 Kms	IOCL Servo Transmission Fluid A	
		Tata Tpr/LC 1613 SK/SE fitted with 697 TC IC Engine	Power Steering	03 ltrs	72000 Kms		
		Tata Mobile 407	Steering System	0.5 Ltrs	80000 Kms		
			Tata Mini Bus 709	Steering System	0.75 Ltrs	80000 Kms	HPCL HP ATF A
			Ashok Leyland Dumper 2516	Power Steering	4 Ltr	80000 Kms	BPCL MAK ATF A
			AMW Dumper	Power Steering	3 Ltr	80000 Kms	
			M&M dumper Torro 25	Power Steering	2.5 Ltr	80000 Kms	
		Stallion 4x4 Light Rec Vehicle	Steering System	4.0 ltrs	80000 kms		
	Servo Trans Dex-II	Ashok Leyland Tpr 1616 BS III	Power Steering	04 Ltrs	80000 kms	Servo Trans Dex-II	
05	STF 10	JCB Excav cum Loader 3DX Super	Transmission oil/filter	19 Ltrs	800 Hrs	IOCL Servo Transmission Fluid F10 HPCL HP ATF F10 BPCL MAK Transmission Fluid F	
06	ST T20	JCB Excav cum Loader 3DX Super	JCB Drive Axle	23 Ltrs	800 Hrs	IOCL Servo Transmission T20 HPCL HP Supretran BPCL MAK Txn Fluid T20	
07	SUKB30	BEML Hyd Excav BE220	Swing Machinery Case	10 Ltr	Range 900-1000 Hrs	IOCL Servo Ultra KB 30	
		BEML Hyd Excav BE220	Hydraulic system	150 Ltr	Range 1900-2000 Hrs		
		BEML Hyd Excav BE220	Final Drive case	3.7 Ltr	Range 900-1000 Hrs	HPCL Hylube X 330 KB	
		BD50 BULLDOZER (With BEML BS6D105-1 Eng)	Final Drive case (each)	28 Ltrs	Range 900-1000 Hrs	BPCL MAK CD 30	
		BD80 BULLDOZER (With BEML BS6D125-1 Eng)	Final Drive case (each)	72 Ltrs	Range 900-1000 Hrs		

		BD50 BULLDOZER (With BEML BS6D105-1 Eng	Transmissi on Case incl.Bevel Gear case	34 Ltrs	Range 900- 1000 Hrs	
		BD50 BULLDOZER (With BEML BS6D105-1 Eng	Main Clutch	15 Ltrs	Range 900- 1000 Hrs	
		BD80 BULLDOZER (With BEML BS6D125-1 Eng	Main Clutch	25 Ltrs	Range 900- 1000 Hrs	
		BD80 BULLDOZER (With BEML BS6D125-1 Eng	Steering clutch case	75 Ltrs	Range 900- 1000 Hrs	
		BD80 BULLDOZER (With BEML BS6D125-1 Eng	Recoil Spring Case	20 Ltrs	Range 450- 500 Hrs	
08	SUKB10	Hydraulic Excv BEML BE-75	Hyd oil (Hydraulic system)/Fil ter	60 Ltrs	Range 900- 1000Hrs	IOCL Servo Ultra KB 10  HPCL Hylube X 310 KB  BPCL MAK CD 10
		BD50 BULLDOZER (With BEML BS6D105-1 Eng	Hydraulic system	50 Ltr	Range 900- 1000Hrs	
		BD80 BULLDOZER (With BEML BS6D125-1 ENGINE)	Hydraulic system	105Ltrs	Range 900- 1000Hrs	
		BEML Wheel Loader	Hydraulic System	130Ltrs	Range 900- 1000Hrs	
			Transmissi on Case	30 Ltrs	500 Hrs	
09	HLP 46	Tata Tpr 1212 SA/SAK fitted with 6BT Engine	Hydraulic System	38 Ltrs	72000 Kms	IOCL Servo System HLP 46  HPCL ENKLO HLP 46  BPCL MAK Hydrol HLP 46  (Slr. No 15,16,17 & 18 are hydraulic oil and Servo System HLP 46 is commonly used instead of others)
		Tata Tpr 1613 SK/SE fitted with 697 TC IC Engine	Hydraulic System	38 Ltrs	72000 Kms	
10	IOCL Servo System HLP 32	JCB Excav Cum Loader 3DX	Hyd system/Oil reservoir	130 Ltrs	Range 900- 1000Hrs	BPCL MAK Hydrol HLP 46
	HPCL ENKLO HLP 32  BPCL MAK Hydrol HLP 32	Ashok Leyland Dumper 2516	Hydraulic System	75 Ltrs	72000 Kms	
11	IOCL Servo Hydrex TH 46 HPCL	Hydraulic Excav Tata Hitachi EX 200	Hyd oil (Hydraulic & Steering system)	220 Ltrs	Range 1900- 2000 Hrs	
	Power Fluid TH 46	Hydraulic Excav JCB JS-200	Hyd system	203 Ltrs	Range 1900- 2000 Hrs	

	BPCL MAK Hydrol T	Hydraulic Excv Tata Hitachi EX 70	Hyd oil (Hydraulic system)	90 Ltrs	Range 1900-2000 Hrs	
		HYDRAULIC EXCAVAT JCB MODEL JS 80	Hyd System	92 Ltrs (Res cap 55 ltrs)	Range 1900-2000 Hrs	
			Track gear oil	1.7 LtrX2 (3.4 Ltrs)	900-1000Hrs	
12	HLP 68	AMW Dumper	Hydraulic System	50 Ltrs	72000 Kms	
		M&M dumper Torro 25	Hydraulic System	60 Ltrs	72000 Kms	
		JCB -Wheel Loader 430Z	Hyd System	128 Ltrs	900-1000Hrs	
		Ashok Leyland Tpr 1616 BS III	Hydraulic System	35 Ltrs	48000 Kms	
		TVRR Escorts HD-85 Engine Kirlosker HA 694	Hydraulic System	90 Ltrs	Range 1900-2000 Hrs	
		Soil Compactor Escort/ Greaves Bomang Engine Kirlosker HA-694	Hydraulic System	90 Ltrs	Range 1900-2000 Hrs	
		L&T Vib Soil Compactor 752	Hydraulic System	180 Ltrs	Range 1900-2000 Hrs	
		Air Comp XA 175 HDAtlas Copco	Compressor Oil	32 Ltrs	750 Hrs	
		Air Comp XAM 140 Atlas Copco(300 CFM)	Compressor Oil	32 Ltrs	750 Hrs	
		Air Comp XAS 76 Atlas Copco (140CFM)	Compressor Oil	32 Ltrs	750 Hrs	
		Air Comp CPS Chicago pneumatic (260 CFM)	Compressor Oil	32 Ltrs	750 Hrs	
		Spm Rock Drill DC-122R	Hyd System	45 Ltrs	900-1000Hrs	
			Compressor Oil	07 Ltrs	500 Hrs	
		Concrete Mixer Universal RM-800	Hyd System	30 Ltrs	Range 1900-2000 Hrs	
13	Servo Hydrex 68	Concrete Mixer (RD-15B3 Akona	Hyd System	90 Ltrs	900-1000Hrs	IOCL Servo System 100  HPCL ENKLO 100  BPCL Mak Hydrol 100
14	SS100	Paver Finisher Sensor Make Apollo AP 550X	Hyd System	190 Ltrs	1500 Hrs	
		Paver Finisher Mechanical Make Apollo RM-6	Hyd System	40 Ltrs	1500 Hrs	

15	Telcon universal 20C	Tata 315V Excavator loader	Rear axle	13 Ltrs	1000 Hrs	Telcon Universal 20C
			Hyd system/Oil reservoir	91(Res cap 37 Ltrs)	1000 Hrs	
			Transmission	15 Ltrs	1000 Hrs	

#### Note

- This lubricant chart is prepared as per HQ DGBR instruction on lubrications under memorandum of understanding between BRO and IOC, HPCL and BPCL vide HQ DGBR letter No.52805/TPC/DGBR/01/E3Q(FOL) dated 16 Sep 2019.
- Slr. No 15,16,17,18 & 19 shown in above table are hydraulic oil and Servo System HLP 46 is commonly used instead of others.
- Lubricants Servo Synith 5W30, Servo Pride XL 5W40, Servo 4T Zoom 10W30, Servo Gear Super LS90, Servo Transmission T30, Servo Transdex II, Servo Hydrex 100, Servotherm Medium, OM 36, Servo Mesh SP 220, Servo Mesh SP 460, Servo Press T-67, Servoneum 100, Servo Coat 100, Servo Electra, Engine Oil 15W40 C14(TEMPEV001 and ESCO Hyd Oil Pt No 5730348200 mentioned in HQ DGBR letter No 52805/TPC/DGBR/01/E3Q(FOL) dated 16 Sep 2019 are special purpose oil and same used in special V/E/Ps.

#### DISCUSSIONS AND CONCLUSIONS

This study is for all types of Tyres, Tubes and batteries and lubricants filters fitted to all Vehicles /Equipments/Plants of deferent manufacturers in BRO. This approach is catering to reduce the cost and items of inventory required for user of all fleets of Equipments. This study is done to overcome day to day crisis of requirement projection from user units e.i. Road Construction Company (RCC), Bridge Construction Company (BCC) and Task Force (TF) etc. Due to vast range and depth of holding of Vehicle/Equipment/Plants in BRO, it is very difficult for ground staff to catch the practical inventory monitoring/control tool to overcome the problem on ground. Different Original Equipment Manufacturers (OEM) have mentioned their different make and size of Tyres, Tubes and Batteries, which leads a continuous confusion to staff working on ground to identify the correct item there are almost more than hundred types of grades of lubricants and their periodicity of change is recommended by various OEMs. Therefore, a better control of inventory is quite difficult. Hence reduced range of lubricants as per ground requirement and purpose for their change periodicity is finalised. Hence, this practical approach is taken and resulted in positive response from various inspecting officers and users from organisation. This further loads to further research on the topic to match time advancement with the induction of new fleet of Equipment of newer and advanced technology.

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