

GOVERNMENT OF HARYANA

**EVALUATION STUDY INTO THE
WORKING OF STONE CRUSHERS
DEPARTMENTALLY RUN BY THE P.W.D. (B & R),
HARYANA**



**ECONOMIC AND STATISTICAL ORGANISATION
PLANNING DEPARTMENT, HARYANA**

PUBLICATION NO : 91

FOR OFFICIAL USE ONLY

**EVALUATION STUDY INTO THE
WORKING OF STONE CRUSHERS
DEPARTMENTALLY RUN BY THE P.W.D. (B & R),
HARYANA.**



**Issued by:
THE ECONOMIC AND STATISTICAL ORGANISATION
PLANNING DEPARTMENT
GOVERNMENT OF HARYANA.**

1973.

P R E F A C E

An evaluation study of the operational functioning of the Stone Crushers, departmentally run by P.W.D. (B & R) was carried out by the Economic and Statistical Organisation, Haryana in 1971-72. The object was to study their operational functioning, efficiency and utilisation. The study covered three construction divisions, namely, Tosham, Dadri and Gurgaon where the crushers were installed.

This report was prepared by Shri P.N. Kanwar, Research Officer under the supervision and guidance of Shri A. L. Katyal, Deputy Economic & Statistical Adviser.

Chandigarh,
the 10th May, 1973.

K. C. GUPTA
Economic & Statistical Adviser
to Government Haryana.

Evaluation study into the Working of Stone Crushers Departmentally run by the P.W.D. (B & R), Haryana.

1. A well developed communication system is essential for economic progress and efficient administration. Prior to the formation of Haryana State, adequate attention was not paid to the development of roads in this region. Taking into consideration the importance and urgency of well developed road system to economic development of the State, it has been decided to connect all the villages in Haryana by metalled roads during the next year and a half. After cent per cent achievement of rural electrification in the State, this is the second crash programme of similar nature. Under this programme, the P.W.D. has a plan to construct about 3,000 kms. of new roads during 1971-72. Consequently, a large number of road construction projects have been undertaken in all the districts of the State. This programme has resulted in a great demand for stone and crushed bajri. As a result, the private agencies dealing with stone crushing have enhanced the rates from Rs. 14.77 per cum in 1969-70 to Rs. 24.00 per cum in 1971-72 (by 62.5%) in Dadri Division (Appendix I). Moreover, the quality of the material supplied by these agencies has deteriorated substantially.

2. To overcome the above difficulties, Haryana Government decided in 1970 to instal a number of stone crushers, to be run departmentally, at various quarries in the State and the necessary sanction for the installation of 12 crushers at different quarries was accorded in October, 1970. Eight of these were to be installed in Tosham and Dadri Divisions (4 in each Division) and the remaining four in Gurgaon and Faridabad Divisions (2 in each Division). The Public Works Department has now put another demand for 14 crushers to be installed in various quarries (Appendix II). Before final decision is taken for the purchase of new

crushers, it has been considered desirable by the Government to get an evaluation made of the working and utility of the crushers already installed. Accordingly, a study has been carried out by the Economic and Statistical Organisation regarding the operational functioning, efficiency and utilisation of these crushers.

3. The field survey was confined to three construction divisions, namely, Tosham, Dadri and Gurgaon, where the crushers were to be installed. A detailed questionnaire was used for the collection of necessary information from the field (Appendix 'A'). The operational analysis was restricted to Tosham Division since the crushers had been put into operation actually in this division only. In respect of the other two divisions, only a review of the progress made upto the date of survey could be attempted, since the crushers had not been pressed into service so far.

Working of crushers in Tosham Division :

4. Two Jaw Crushers, two Jaw-cum-Roller Crushers and one Air Compressor were sanctioned in October, 1970. These were to be installed at Khanak quarries, located at a distance of 8 kms. from Tosham on Tosham-Hissar road. On the date of survey only two jaw crushers (one had been installed in December, 1970 and the other in April, 1971) with a crushing capacity of 12 to 16 tons and 25 to 30 tons per hour respectively, and one compressor was functioning. The first jaw crusher started functioning from 27th March, 1971 and the second from 19th June, 1971. They took about three months from the date of installation to start production. The delay was attributed by the P.W.D. to the completion of certain formalities regarding electricity connections!

5. Certain Lapses were also observed in respect of procurement of machinery and installation. For instance, some of the essential accessories like belt conveyors, without which efficient operation could not be possible were not purchased along with the

main machinery. A jaw crusher meant for making rori was installed independently without the roller crusher needed for bajri making. The two units had to function simultaneously to meet the requirements both in respect of rori and bajri together. As regards installation lapses, the arrangements for transmitting electricity to the site of the second crusher was made in April 1971, after the first crusher had already started functioning in March, 1971. This caused stoppage of electricity to the first crusher for seven days resulting in consequent loss in production. Had proper thought been given sufficiently in advance to operational planning, much of the delay in installation and starting production could have been avoided saving overhead cost per unit considerably. Since new ventures do have their problems, the present situation may not continue. It may rather improve with the passage of time, as the department gains operational experience.

Cost-Benefit appraisal :

6. A sum of Rs. 4,06,000 was sanctioned for the purchase of four crushers for Tosham Construction Division. Only two crushers were purchased at the cost of Rs. 2,03,452 and the remaining amount of Rs. 2,02,548 was not utilised (Appendix III).

The first crusher, which commenced production in the month of March, 1971, had worked for three months upto the date of survey. As such, the appraisal of its functioning could be done for this period only. The second crusher had been pressed into service only recently and expenditure/production data in respect of this was not available. Hence no appraisal could be made of its functioning.

7. The total crushed material produced by the first crusher during a period of three months was 52,240 cubic feet of the value Rs. 28,710. The total expenditure incurred to obtain this production was Rs. 34,030 excluding interest on investment and supervi-

sory costs. The average cost of material crushed by the departmental crusher came to Rs. 65.19 per 100 cubic feet whereas the same material could be available from private contractors at Rs. 55/- per 100 cubic feet. The main reason for higher cost of departmentally crushed material was under utilisation of the available capacity of the crusher. The details of the calculations made in respect of cost are set out in Appendix IV.

Utilisation of Available Capacity :

8. Hardly 50% of the crushing capacity of the first crusher was utilised during the period of its operation. It worked for 68 days during this period, putting on the average only four hours per day.

The necessary details are given below :

Operational analysis of first crusher installed at Tosham Construction Division

Month in which worked	No. of working days in the month	No. of days worked	No. of hours worked per day	Total hours worked	Total output (in cubic ft.)	Value of output (Rs.)
1	2	3	4	5	6	7
March (28th to 31st)	4	4	4	16	900	495
April	30	21	4	84	19,000	10,450
May	31	26	4	104	19,650	10,780
June	30	17	4	68	12,690	6,985
Total	95	68	4	272	52,240	28,710

9. The second crusher was installed in the first week of April, 1971, but actually started functioning from the third week of June. It remained idle for two and a half months. It had 33 working days upto the date of survey but worked for 28 days, putting on the average only 3 hours per day. Thus, its overall performance in terms of utilisation of available capacity was quite disappointing.

The relevant details are set out below:—

*Operational analysis of second crusher installed at Tosham
Construction Division*

Month in which worked	No. of working days in the month	No. of days worked	No. of hours worked per day	Total No. of hours worked	Total output (in cubic ft.)	Value of output (Rs.)
1	2	3	4	5	6	7
June (20th to 30th)	11	8	3	24	3,250	1,787
July (1st to 22nd)	22	20	3	60	11,800	6,490
Total	33	28	3	84	15,050	8,277

The crushing capacity of the first crusher was 12 to 16 tons per hour and of the second 25 to 30 tons (slightly more than double), whereas the performance of the first was 192 cubic feet of output per hour against 180 cubic feet of the second.

10. It was also reported that these crushers had the capacity to work for 16 hours a day in two shifts but in actual practice, they were found putting in only 3 to 4 hours work per day. This

should provide a sufficient idea of the extent to which the available capacity was being utilised.

The reasons given for under utilisation of capacity were; (a) initial stage of the project : (b) non-availability of labour for breaking stones causing shortage of material to be used as input; and (c) frequent electricity break-downs.

11. The problem of shortage of material due to non-availability of labour was quite serious and appropriate measures are needed to be taken urgently to overcome this situation. One of the measures could be to arrange the necessary labour through labour contracting agencies by adopting advance payment system. Unless regular and adequate supply of the material input is ensured, the crushers cannot be put to optimum use. This aspect should have received priority attention even before the installation of crushers.

Dadri Division of Rohtak Circle :

12. Four stone crushers were sanctioned for Dadri Construction Division in October, 1970, along with the sanction for Tosham Division. But the purchase and installation were not done simultaneously. One crusher was purchased on 8.3.1971, the second on 24.3.1971 and the third on 16.7.1971. The first two crushers had been installed but they had not started working upto the date of survey. The third was yet lying in store and had not been installed. It was reported that the first two crushers would start functioning in the last week of July, 1971. It would, thus be seen that it took more than four months from the date of installation to get work started. The fate of the third is yet uncertain. Such delays need immediate attention of the department.

13. One jaw crusher had been installed at Kapoori quarries (10 kms. from Dadri) and another one at Taiwala (17 kms. from Dadri), but no Belt Conveyors had been procured alongwith the crushers. It was not understood as to how the crushers could be

put to efficient use without the necessary accessories. Similar was the case in regard to the jaw crusher installed at Kapoori quarries. The air compressor for breaking stones had not been arranged. In absence of this, the input material could not be made available. These were serious lapses which should have been avoided, taking lesson from the experience at Tosham. But it seems that no such efforts were made in this respect.

14. The same story is being repeated even at Gurgaon. Only one crusher has been purchased at a cost of Rs. 93,350. It has not been installed so far. If things proceed at the present pace, it might not be possible to instal all the sanctioned crushers this year. The apprehension is that by the time the crushers attain optimum level of production, the period prescribed for the completion of crash programme of road development would be over.

15. The project lacked proper assessment of simultaneous requirement of various items of machinery, necessary for efficient functioning. This resulted in omission in procurement of certain essential items at the time of first purchase which delayed the final product. It appears that reasonable attention was not paid to operational planning in advance to ensure optimum functioning of crushers.

16. The department has a programme to construct 600 kms. of roads during 1971-72 in each circle. On the average, one stone crusher, at optimum level of production, can provide material for 15 kms. of road. Thus, four crushers sanctioned for a circle would be able to meet only 10% of the total demand. The remaining demand would have to be met through private agencies.

APPENDIX

APPENDIX

Average procurement price of the material during 1968-69, 1969-70,

Sr. Year No.		Tosham Division			
		Rori		Bajri	
		Stone soling (Rs.)	Stone Metal (Rs.)	6mm to 20mm (Rs.)	6mm to 10mm (Rs.)
1	2	3	4	5	6
1	1968-69	11.66	15.19	15.89	16.95
2	1969-70	12.35	15.89	19.42	20.48
3	1970-71	12.35	17.65	23.66	25.43
4	1971-72	12.35	17.65	30.02	30.02

I

1970-71 and 1971-72 prevalent in different Divisions under study.

(price per cubic metre)

Dadri Division				Gurgaon Division			
Rori		Bajri		Rori		Bajri	
Stone soling (Rs.)	Stone Metal (Rs.)	6mm to 20mm (Rs.)	6mm to 10mm (Rs.)	Stone soling (Rs.)	Stone Metal (Rs.)	6mm to 20mm (Rs.)	6mm to 10mm (Rs.)
7	8	9	10	11	12	13	14
5.30	7.07	13.00	14.77	NA	NA	NA	NA
5.30	7.07	13.00	14.77	8.47	11.65	19.40	NA
6.70	11.70	17.50	19.50	8.47	11.65	19.40	NA
6.70	11.70	22.00	24.00	8.47	12.82	21.00	NA

APPENDIX

**Classification of the total approximate quantity of
during 1968-69, 1969-70, 1970-71 and 1971-72**

Sr. No.	Year	Length of roads (in Kms.)	Tosham Division (cubic metres)			
			Rori		Bajri	
			Stone soling	Stone Metal	6mm to 20mm	6mm to 10mm
1	2	3	4	5	6	7
1	1968-69	4.00	2919	1492	88	—
2	1969-70	44.27	11600	16500	1232	1035
3	1970-71	30.06	13400	29840	2110	314
4	1971-72	80.00	16680	29840	5412	6615

I-A

**material got crushed for Tosham and Dadri Divisions
(Figures in cubic metres and Kms.)**

Length of roads in Kms.	Dadri Division (Cubic metres)			
	Rori		Bajri	
	Stone soling	Stone metal	6mm to 20mm	6mm to 10mm
8	9	10	11	12
15.09	6230	5500	660	4600
72.28	30320	26350	3170	6260
54.30	22750	19780	2370	6300
250.00	105256	91500	11000	12,000

APPENDIX

Rough Cost Estimates for the purchase of Stone Crushing construction of

Sr. No.	Description of Machinery required.	Hissar circle
1	2	3
1	Jaw crushers (Prabhat) 16" × 9" capacity 16/18 tons/hour c/w 25 H. P. Electric Motor and accessories feed size 7", output 2½" and under.	2
2	Roll crushers (Prabhat) 36" × 20" capacity 18/20 tons/hours c/w 75 H. P. Electric Motor and accessories feed size 3", output 3/4" and under.	2
3	Apron feeders.	2
4	Belt conveyors 20" width × 15 metres long with suitable electric motor and accessories.	10
5	Vibrating screens 1200 mm × 3000 mm having 3 decks with 12 H. P. electric motor and accessories.	2
6	7½ tons capacity T.M.B. Trucks chasses with accessories duly fitted with steel body and driver's cabin for transportation of materials.	4
7	Tractor mounted mobile workshop unit with tools.	1
8	C.S.T. @ 3% plus insurance freight and transportation to site @ 2%.	—
9	Cost of installation of jaw crushers, roll crushers apron feeders, belt conveyors, vibrating screens at suitable quarry sites including cost of construction of suitable room and shed for electric motor and mobile workshop.	25,000/-
10	Grand Total :	—

II

Machinery for P. W. D. (B.&R.) Haryana required for
New roads.

Rohtak circle	Ambala, circle	Gurgaon circle	Total number required	Rate/ unit	Total Cost.
4	5	6	7	8	9
2	1	4	9	35,000/- each	3,15,000/-
2	1	—	5	1,20,000/- each	6,00,000/-
2	1	—	5	35,000/- each	1,75,000/-
10	5	—	25	25,000/- each	6,25,000/-
2	1	—	5	36,000/- each	1,80,000/-
4	4	4	16	55,000/- each	8,80,000/-
1	1	1	4	50,000/- each	2,00,000/-
—	—	—	—	5 percent	1,48,750/-
25,000/-	16,000/-	10,000/-	—	—	76,000/-
—	—	—	—	—	31,99,750/-

APPENDIX**Division-wise classification of the amount sanctioned and
for purchase and**

Sr. No.	Name of Division	Actual amount sanctioned in (Rs.)
1	2	3
1	Tosham (Hissar circle)	4,06,000/-
2	Dadri (Rohtak circle)	4,06,000/-
3	Gurgaon and Faridabad (Gurgaon circle)	7,41,000/-
Total		15,53,000/-

III

**amount actually spent to the date of survey 22nd July, 1971
installation of crushers.**

Actual amount spent in (Rs.)	Percentage of the amount spent to amount sanctioned.
4	5
2,03,452/-	50.11
2,50,580/-	61.72
93,350/-	12.60
5,47,382/-	35.25

APPENDIX

**Classification of actual Expenditure incurred on different
to date of survey (22nd July, 1971) at Tosham, Dadri,**

Sr. No.	Machinery and its spare parts.	Tosham (Hissar circle)		Total
		Crusher	Numbers.	
		I	II	
1	2	3	4	5
1	Actual price of the crusher.	31,000/-	93,350/-	1,24,350/-
2	Price of the accessories of the crusher which were necessary for its working			
	(i) Apron feeders.	—	—	—
	(ii) Belt conveyors along-with motor & other accessories.	3,500/-	5,000/-	8,500/-
	(iii) Vibrating screens alongwith motor and other accessories.	—	—	—
	(iv) Trucks with all its accessories and other materials.	—	—	—

III—A

items on the procurement of crushers and its spare parts,
Gurgaon and Faridabad Construction Divisions.

Dadri (Rohtak circle)			Gurgaon & Faridabad (Gurgaon circle)		Grand Total (5+9+11)	
Crusher Numbers			Crusher Numbers			
I	II	III	Total	I	Total	
6	7	8	9	10	11	
31,930/-	31,930/-	93,350/-	1,57,210/-	93,350/-	93,350/-	3,74,910/-
—	—	—	—	—	—	—
—	—	—	—	—	—	8,500/-
—	—	—	—	—	—	—
—	—	—	—	—	—	—

1	2	3	4	5
(v) Tractor mobile workshop unit with tools.		—	—	—
(vi) C. S. T. insurance freight and transportation charges to the site.		1,345/-	4,717/-	6,062/-
(vii) Cost of construction of sheds and other facilities provided at the site such as motor room, retaining wall, crusher, foundation etc.		12,000/-	15,000/-	27,000/-
(viii) Air Compressor.		37,540/-	—	37,540/-
(ix) Total cost of installation of the crushers. (1+2)		85,385/-	1,18,067/-	2,03,452/-

6	7	8	9	10	11	12
30,000/-	30,000/-	—	60,000/-	—	—	60,000/-
260/-	260/-	2,850/-	3,370/-	—	—	9,432/-
15,000/-	15,000/-	—	30,000/-	—	—	57,000/-
—	—	—	—	—	—	37,540/-
77,190/-	77,190/-	96,200/-	2,50,580/-	93,350/-	93,350/-	5,47,382/-

APPENDIX IV

Cost-Benefit appraisal (for the month of March, April and May, 1971) of crusher No. I installed at Tosham Construction Division.

	Rate per 100 cubic feet	Total quantity obtained in 100 cubic feet	Total price
(A) Input Expenses			
(i) Extraction charges	14—00	522	7,308—00
(ii) Carriage charges	12—00	522	6,264—00
(iii) Royalty	8—00	522	4,176—00
(iv) Panchayat Compensation	2—50	522	1,305—00
(v) Air compressor charges	3—00	522	1,566—00
Total : (A)	39—50	522	20,619—00
(B) Running Expenses :			
	Rs.		
(a) Electricity charges :	1,866—00		
(b) Diesel, Petrol etc. :	3,164—00		
(c) Repair and maintenance :	3,251—00		
Total: (B)	8,281—00		

(C) Establishment Costs :		Rs.	
(a) Foreman (one)	1,350—00		@ Rs. 450/- per month
(b) Operator (one)	630—00		@ Rs. 210/- per month
(c) Beldar (six)	2,700—00		@ Rs. 150/- per month
(d) Chowkidar (one)	450—00		@ Rs. 150/- per month
Total : (C)		<u>5,130—00</u>	

Costs	Rs.	Benefit	
Total expenditure incurred <i>i.e.</i> (A+B+C Above)=34,030-00		Total quantity crushed and its equivalent price as if it has been purchased from local contractors.	5,2240 cubic feet @Rs.55/- per 100 cubic feet.
Price per 100 cubic feet of the departmentally crushed material=	65-19	Price charged by the local contractors per 100 cubic feet	= Rs. 28710/- = Rs. 55/-

Note :- While arriving at the above analysis the following items have been excluded from the cost side :—

- (i) Interest charges on investment.
- (ii) Supervisory costs of S.O's. and S.D.O's
- (iii) The period accounted for is for 3 months only.
- (iv) The quality of the departmentally crushed material is superior to that of supplied by private contractors.
- (v) The analysis is for one crusher only as the cost of production data was not available for the second crusher.

(APPENDIX 'A')

Economic And Statistical Organisation

**Evaluation Study into the working of 'Stone Crushers' departmentally
run by the P.W.D.,B.&R. Haryana.**

Block I—Identification Particulars.

- 1.1 Number and Trade mark
of the crusher.
- 1.2 Capacity of the crusher per
hour (in tons).
- 1.3 H. P. of the motor.
- 1.4 Output (size).
- 1.5 Exact present location of
the crusher.
- 1.6 Date on which purchased.
- 1.7 Date on which it was ac-
tually brought to the site of
its first location.
- 1.8 Date on which it was put
into operation at its first
site
- 1.9 Date on which it was actu-
ally put into operation at
its present site.
- 1.10 Had there been any-
change of the site of the
crusher during the year
1970-71 ?

Yes/No

1.11 If yes, give details as below :

Sr. No.	Name of the Site.	Date on which it was brought to the Site.	Date on which it actually commenced its work at the site.	Date on which it was removed to other site.	Remarks
1	2	3	4	5	6

1.12 Was the crusher found to be in working order on the day of visit ?

Yes/No

1.13 If no, what was the defect in its working.

1.14 Was the crusher in action on the day of visit ?

Yes/No

1.15 If no, what were reasons of its being lying idle.

Block II—Expenditure (costs) incurred on the crusher.

(A) Overhead costs (Rs.)

2.1 Actual Price of the crusher.

2.2 Price of the accessories of the crusher which were necessary for its working, give details as below ;—

(i) Apron feeders.

- (ii) Belt conveyors along-with motor and other accessories.
- (iii) Vibrating screens along-with motor and other accessories.
- (iv) Trucks with all its accessories and other materials.
- (v) Tractor, mobile workshop unit with tools.
- (vi) C.S.T. insurance, freight and transportation charges to the site.
- (vii) Cost of construction of sheds and other facilities provided at the site
- (viii) other miscellaneous charges.

2.3 Total cost of installation of the crusher with all its paraphernalia as detailed above (2.1+2.2).

(B) Supplementary costs.

2.4 Working expenses of the crusher during 1970-71 as detailed below :—

- (i) Electricity charges.

- (ii) Diesel oil, petrol and other lubricants.
- (iii) Spare parts.
- (iv) Repair and maintenance.
- (v) Other (specify)
 - (a)
 - (b)
 - (c)

(C) Staffing position and its expenditure.

2.5 Give the details of the staff employed to look after the running of the crusher during 1970-71.

Sr. No.	Name of the category of the employee.	Number of persons employed	Total em-moluments drawn during the period (1970-71)	Whole time or part-time.	Remarks.
1	2	3	4	5	6

- 2.6 Any other expenditure (cost overhead and supplementary) incurred on the maintenance of the crusher which has not been accounted for in block No. II above.

**Block No. III out put of the crusher (during 1970-71)
and its working.**

- 3.1 Please provide the following details about the working and out put of the crusher since its installation.

Sr. No.	Months/ period	Total No. of days in the month.	Total days for which it remained in operation.	Hours worked per day.	Total output in tons during the period.	Price of output as if it has been purchased from the private crushers (per ton)
1	2	3	4	5	6	7

- 3.2 Period (days and hours) for which the crusher remained out of use/order during 1970-71.
- 3.3 Reasons why it remained out of order/use during 1970-71 as detailed below:-

Period for which it remained out of use/order.	*Reasons for its being out of order/use.	Loss in money terms due to its being out of use/order.
--	--	--

*Reasons should be probed deeply so as to take stock of its actual utilisation and under-utilisation.

- 3.4 Do you feel that it has been beneficial for the State to instal the crusher instead of getting material from private crushers. Yes/No
- 3.5 If yes, in which way it has been beneficial ?
- (a) Financially
 - (b) Qualitatively
 - (c) Quantitatively
 - (d) Timely
 - (e) Any other (specify)
 - (a)
 - (b)
 - (c)

Block IV General

- 4.1 What is the normal life of the crusher ?
- 4.2 What is its present depreciated value ?
- 4.3 For how many hours the crusher can work keeping in view its reasonable functioning ?
- 4.4 Was it worked satisfactorily or there were some defects ?

- 4.5 What is the present total capacity of the crusher per hour ?
- 4.6 Is there had been any difference in its capacity from the period when it was bought ?
- 4.7 If the capacity has decreased please give the reasons for its decrease ?
- 4.8 When the road development programme is over, after a specific period of time, will it be possible to utilise the crushers to full capacity? If so, in which way.
- 4.9 If not, in your opinion should the purchase and operation of stone crushers be excentuated/ curtailed or remain the same.
- 4.10 What are your views if instead of putting crushers into operation, manual labour is employed. Will this not create employment opportunities in such a way that the programme is not effected.
- 4.11 Is the present demand being

met departmentally or still the material is purchased from the private crushers ?

- 4.12 Has the installation of departmental crushers effected adversely the private crushers? If yes, in which way.
- 4.13 Demand for more 14 crushers in addition to the existing 10 has been put up by the department. Will this demand be sufficient to carry out the road programme as stipulated.
- 4.14 What is the procurement price of material (Stone Bajri) during the following years :-
- (a) 1968-69
 - (b) 1969-70
 - (c) 1970-71
 - (d) 1971-72
- 4.15 Total approximate quantity got crushed by the private crushers during the years :—
- (a) 1968-69
 - (b) 1969-70
 - (c) 1970-71
 - (d) 1971-72
- 4.16 Remarks and views of the investigator/Ex.EN of the circle :—