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TENDER FOR UNDERGROUND CABLE CONSTRUCTION WORKS

BID DOCUMENT

**TENDER FOR UNDERGROUND CABLE CONSTRUCTION WORKS
FOR ALL TYPES OF UNDER GROUND COPPER CABLES AND OTHER
RELATED WORKS IN BIJAPUR TELECOM DISTRICT FOR THE
YEAR 2009-10**

TENDER FORM NO :

NAME OF THE REV DIST :

TENDER FORM FEE :

PAID VIDE RECEIPT NO :

DATED :

ISSUED TO :

.....

Asst.General Manager (Plg)
O/o.G.M.Telecom, B.S.N.L.,
BIJAPUR – 586 101.

SECTION I

No: W-50/ Cable Tender /09 /2008-09 /3 dated @ BIJAPUR the 02/12/2008

Sub: Notice inviting tender for underground cable construction works for 5 Pair , other than 5 Pair cable & OFC Maintenance works and other related cable works in BIJAPUR SSA for the year 2009-10

Properly sealed tenders (Preferably by PVC tape / Sealing wax) are invited for and on behalf of the BSNL by the General Manager Telecom, BSNL BIJAPUR for underground cable construction works including OFC Maintenance works in BIJAPUR Telecom District, from the eligible contractors both enlisted and non enlisted having experience in U/G cable construction works in DOT, BSNL ,Railways, PWD, HESCOM etc OR experience in Underground trenching works for pipe laying etc in any other Government / PSU organization with having **Registered with EPF**. For further details you may please visit our web site www.karnataka.bsnl.co.in

1. Contractor will have to submit experience certificate issued by an officer not below the rank of D.E/E.E or Equivalent Officer of BSNL, Railways , PWD, HESCOM etc. and any other Government / PSUs which is mandatory. Experience should be of minimum 10 Kilometers of trenching for telecom cable laying or pipe laying Or both together. GMTD Bijapur reserve the right to relax the experience to 5 Kms in exceptional cases.
2. The contractors will have to carry out the cable works as per the guidelines given under the heading "UNDERGROUND CABLE CONSTRUCTION PRACTICES MANUAL".
3. The successful tenderer should submit and execute an agreement of contract on a non judicial stamp paper of Rs.100/- as per ANNEXURE-I . Tender will be awarded only after payment of required Security Deposit amount and execution of agreement.
4. Area of contract:.

A) For U/G CABLE FOR 5 PAIR, OTHER THAN 5 PAIR CABLE & OFC Maintenance Works :

SL NO	NAME OF SDCA	Cost of Bid Document (Non Refundable) in Rs	EMD / Bid Security Deposit (2.5 %) in Rs	Estimated cost of work in Rs
01	BIJAPUR	1125	57625	23,05,000
02	BABLESHWAR	563	7,500	3,00,000
03	B BAGEWADI	563	11,625	4,65,000
04	CHADCHAN	563	10,800	4,32,000
05	D HIPPARAGI	563	7,475	2,99,000
06	INDI	563	7,500	3,00,000
07	MUDDEBIHAL	1125	13,250	5,30,000
08	SINDAGI	1125	14,925	5,97,000
09	TELGI	563	7,925	3,17,000
10	BAGALKOT	1125	32,175	12,87,000
11	BADAMI	1125	14,450	5,78,000
12	BILAGI	563	11,275	4,51,000
13	HUNAGUND	1125	19,850	7,94,000
14	JAMAKHANDI	563	11,625	4,65,000
15	MUDHOL	1125	27,375	10,95,000

5. The quantum of work mentioned in schedule is only indicative and may vary.
6. Separate tender for each SDCA for 5 pair cable, Other than 5 pair and OFC maintenance works is to be submitted with separate EMD amount. Contractor can apply for more than one SDCA submitting separate tender form for each zone with required EMD.
7. The tender documents may be obtained from the Planning Section by producing the ACG-67 receipt issued for the cost of the tender document in cash/ or DD drawn in favour of Accounts officer (cash) BSNL, o/o GMT Baijpur payable at Bijapur. Tender document can also be downloaded from our website www.karnataka.bsnl.co.in and a DD equivalent for the tender document amount drawn in favor of Accounts Officer (Cash) BSNL, o/o GMTD BIJAPUR should be enclosed to the tender document.
8. The tender application for each SDCA should be addressed separately to Sri G N MANGALAGI Asst. General Manager (Planning) o/o General Manager Telecom BIJAPUR super scribed as " For U/G CABLE FOR 5 PAIR, OTHER THAN 5 PAIR CABLE & OFC Maintenance Works and deposited in the tender box kept in the o/o GMT BIJAPUR or sent by post/courier on or before due date.
9. The Earnest Money Deposit as mentioned against each SDCA in the above table should be paid in the form of Bank Demand Draft obtained from any Nationalized Bank drawn in favour of "Accounts Officer (Cash) B.S.N.L, o/o GMTD Bijapur". DD in original should be enclosed along with Tender Application without which the tender will not be considered. DD should be obtained separately for each SDCA.
- 10 The tender, which is not accompanied by the requisite EMD, shall be summarily rejected. Tender will not be accepted/ received after the expiry of date and time. The General Manager Telecom BSNL Bijapur reserves the right to reject any or all tenders without assigning any reason what so ever.
- 11 Tender document will not be available by post
- 12 Bid for each SDCA should be submitted in two envelopes placed inside a main cover. These envelopes should contain the following

Envelope	Marked on the cover	Contents of Envelope
First	Qualifying bid	Containing documents as per clause 50 of terms and conditions
Second	Financial Bid	Rates duly quoted by the tenderer in the prescribed format (Schedule)

On all these envelopes the name of the tenderer and whether "qualifying" or "Financial" bid must be clearly mentioned and should be sealed (with sealing wax/ packing PVC tape). These envelopes are to be placed inside an outer envelope and properly sealed (preferably with sealing wax/packing PVC tape). The tenders, which are not submitted in the above mentioned manner should be summarily rejected and bid will be returned, unopened. All envelopes (2 inner and one outer) must bear the following.

13 Successful tenderer has to pay EPF deducted from the salary of labourers engaged to Asst. Commissioner of EPF (Employees Provident Fund) through cheque and produce proof to BSNL in r/o every job carried out by him.

Tender for cable construction works

“NOT TO OPEN BEFORE DUE DATE OF TENDER”

(Tender No-----)

Name of SDCA-----

The qualifying bid will be opened first and evaluated. The financial bids of those bidders whose qualifying bids are qualified only be opened. Date of opening of financial bid will be intimated. Other financial bids will be returned unopened.

Sale of Tender documents : Between 10 00 hrs to 15 00 hrs from 09-01-2009 to 29-01-2009

(On all working days)

Time and last date of submission of bid: up to 15 00 hours on 30-01-2009

Time of Bid opening : at 1530 hrs on 30-01-2009.

Asst.General Manager (Planning)
O/o the General Manager Telecom
BIJAPUR-586101
Phone no. 08352-244155
Mobile No 9449838799

SECTION II
TENDERER'S PROFILE

Passport Size
Photograph
of the tenderer
authorised
Signatory hold
power of
Attorney

General:

1. Name of the Tenderer / Firm :

2. Name of the person submitting the tender whose photograph is affixed:

Shri/Smt.

(In case of Proprietary/Partnership firms, the tender has to be signed by Proprietor/Partner only, as the case may be)

3. Address of the tenderer/firm :

.....
.....

4. Telegraphic Address :

5. Tel No. (with STD Code) :(Office)(Fax)(Res).....Mob:

6. Registration & incorporation particulars of the firm:

- (i) Proprietorship
- (ii) Partnership
- (iii) Private Limited
- (iv) Public Limited

(Please attach attested copies of documents of registration/incorporation of your firm with the competent authority as required by business law)

7. Name of Proprietor/Partners/Directors:

.....
.....

8. Tenderer's Enlistment Certificate details (BSNL/CPWD/PWD/RAILWAYS or any other organization.)

- a) Category :
- b) Number :
- c) Issuing authority :
- d) Issued on :
- e) Valid up to :

(An attested copy of the Enlistment Certificate may please be enclosed)

9. Tenderer's bank, its address and his Current Account Number:

10. Permanent Income Tax Number, Income Tax Circle :

.....
(Please attach a copy of last income tax return)

(b) Details of EPF registration :

11. Infrastructural capabilities:

a) Capacity of trenching per day (in metres) :

b) Capacity of cable laying per day (in metres) :

c) Capacity of pulling cable through duct per day (in metres) :

d) Capacity of engaging mazdoors per day :

e) Particulars of vehicles available with the tenderer :

Type of Vehicle (s)	Registration No.
---------------------	------------------

f) Particulars of other machines possessed by the contractor which can help in trenching, Cable laying and cable pulling:

.....
12. Details of Technical and supervisory staff :

I/We hereby declare that the information furnished above is true and correct.

Signature of Tenderer/Authorised Signatory:

Name of the Tenderer:

(Seal of the Tenderer)

Place:

Date:

SECTION III

TERMS AND CONDITIONS

1. Specification of work.

a. Under ground Copper cable, 5 pr cable & OFC cable trench .

Trench for (in all type of soils)	Width at bottom in Cms	Depth in Cms
U/G Copper Cable other than 5 pr cable	30	100
5 Pr Copper Cable	30	60
U/G OFC cable	30	165

b. Jointing of cable pairs : Jointing of cable conductors by UY Connector, twisting or by machine jointing using modular connector.

c. D P Erection.

External D P :- External DP of 5 pr or 10 pr are to be fitted on post with the help of fixtures such as DP clamps pole brackets etc. Internal D P :- i) Internal DP of 5 Pr / 10 Pr are to be fixed to wall with the help of suitable wall Plugs / wooden gatti and screws at an approximate height of 7 ft. ii) Internal DPs of 5 Pair are also to be terminated inside sub's premises by drilling hole in the house wall or through wooden frames of window / Door as per the wish of Subscriber.

d. Erection of Pillar.

The plinth for erection of pillar shall be made of RCC cast at site, the dimensions of the pit for casting the foundation of the plinth shall be as under.

Length = W + 30 cms

Width = D + 30 cms

Depth = 110cms.

Where W= Width of the pillar shell, D = Depth of the pillar shell.

The pillar should be installed in safe places on footpaths at suitable locations convenient and accessible for maintenance as per the directions of the field officers. Pillars are also to be earthed by using materials such as charcoal, salt, sand etc

e. Painting and Sign writing of Pillar and DP.

The Pillars /DPs shall be painted and sign written with enamel paint of reputed brand.

The trench will be along the road side or any other route that will be specified from time to time by the in charge officer. The cable laying work includes digging, trenching, cleaning it, laying the required cable, placing the bricks and closing the trench in full and also includes the cost of bricks and cost of transportation of all type of materials like cable drums and other stores to the work spot from the respective SDCA HEAD QUARTERS stores and bringing back balance stores to the SDCA HEAD QUARTERS stores. Separate rate should be quoted per running meter for different types of surfaces as given in the Financial Bid including Cement Roads for each of the areas specified in the notice. The rate should be exclusive of the cost of bricks which are to be quoted separately. The rate for laying additional underground cable in the same trench , laying of cable in ducts, Jointing, DP erection with sign writing and pillar erection with RCC plinth construction painting, sign writing including cost of materials should also be quoted in the price schedule separately.

If the depth is less than prescribed depth due to unavoidable circumstances, suitable precaution like solid laying, laying through GI pipes etc. are to be deployed and relaxation for the same may be obtained from the competent authority .

2. Burnt bricks will be of the following specification.
 - a. Burnt brick size 9" x 4' x 3'
 - b. Size should not vary by more than 2%
 - c. The bricks should be laid above the cable of size 100pr and above at the rate of 4 nos per each running meter of the cable as per the standard of the BSNL.
 - d. The burnt bricks should be of first class standard specification made of good brick earth, thoroughly burnt and should not increase in weight by more than 20% of its original weight after half an hour of sinking by immersion in water. Bricks should not break down when dropped flat on ground from a height of one meter.
 - e. Sample pieces (5 nos) should be submitted on the day of laying cables for the purpose of testing the comprehensive strength of the bricks by the competent authority and it should be as per CPWD standard.
3. The performance security at 2.5 % of estimated cost has to be deposited by successful contractor within 10 days from the issue of acceptance letter of tender. This is in addition to the EMD already paid by the tenderer. and additional security deposit 10% will be deducted from bills.
4. In case the successful tenderer fails to deposit the additional security deposit amount, execute the agreement bond, within 20 days from the date of acceptance of the tender, EMD amount paid will be forfeited.
5. The EMD of the unsuccessful tenderers will be refunded soon after the finalisation of tenders. The EMD of successful tenderer will be retained as security deposit.
6. The EMD amount and additional security deposit deducted from the bills of successful tenderer will be refunded only after three months from the date of completion of the tender contract period and after obtaining NO OBJECTION CERTIFICATE from the concerned field officers.
7. Any loss or damage to the BSNL properties will have to be made good by the respective contractor, also any damage towards pipes, electrical cables or other properties of other BSNLs will have to be made good by the respective contractor of the concerned area.
8. The successful tenderer after the award of work to him should commence the work within three days of the date of receipt of work order, failure to commence or complete the work within the stipulated period or to abide by any one of the conditions in the tender agreement will result in the tender cancellation and forfeiture of EMD amount, additional security deposit. Any loss incurred to the BSNL will also be made good by the contractor.
9. Any deviations in the standard of the work of cable laying will have to be made good at the cost of the contractor concerned and work is to be carried out as per E.I under the supervision of field SDE.
10. Payments: 90% on presentation of bill, 10 % after three months from date of completion of contract period. Income Tax and surcharge on I.T and sale tax will be recovered from the bills as per the rules.
11. The period of tender shall be for one year from the date of acceptance of the tender i.e, date of the agreement.
12. The BSNL reserves the right to extend the period of contract as deemed fit till fresh tender is finalised.
13. Bricks for local cables should be laid length wise along the cable. For PCM/Trunk cables the bricks should be laid breadth wise.
14. The cost of damage to working cables are to be made good by the respective contractors only and the cost as recommended by the concerned field officers will be recovered from the bills submitted for payment. The decision of the GMT BIJAPUR regarding the extent of damage will be final and binding on the contractor.

15. Excavation of trench includes cutting of tree roots, removal of any other constructions like boulders, removal of bushes, wetting the trench with water etc. for which no additional payment will be made.
16. L-1 will be decided based on the rate quoted for trenching, laying of cable and jointing for 1 Km. separately for part II (5 pair cable) and part I (other than 5 pair cable) of financial bid. L1 will be decided separately for part III (OFC cable) of financial bid based on the lowest rate quoted. The GMTD, BSNL, Bijapur reserves the right to award work to more than one tenderer at L1 rate.
17. Termination for default: (a) If the contractor fails to carry out the work within 30 days after the receipt of work order from the BSNL, the contract shall be terminated and action will be taken to forfeit the security deposit.
(b) BSNL may without prejudice to any other remedy for breach of contract by written notice of default sent to the contractor terminating his contract in whole or in part.
18. Liquidated damages:
(a) If the tender fails to execute the work within the prescribed period, the BSNL shall be entitled to recover half percentage of the value of the delayed work for each week of delay or part thereof subject to minimum of 5% of the delayed work. The quantum of liquidated charges levied by the BSNL is final and is not challengeable by the contractor.
(b) If the work is not completed even after 20 days beyond the period specified in the work order, the BSNL has the right to terminate the contract and the forfeit the security deposit.
19. The work is required to be carried out under the supervision of BSNL officials/officers on issue of work orders by concerned SDEs. The work will have to be undertaken as and when the work orders are issued. The contractor should make fool-Proof arrangements for getting the work orders by post or by local enquiry at the concerned Sub Division Head quarter. The works are to be commenced within 3 days from the date of issue of work orders by the concerned SDEs. The stores required for the work will be supplied at the store yards in respect of Sub Divisional Head Quarters. The contractor should be able to carry the stores from the SDCA Head Quarters to the various work spots and distribute the same. Surplus stores should be transported back to SDCA Head Quarters. The rates quoted should include the transportation charges.
20. Tenders which are not submitted in the prescribed format will be rejected.
21. The General Manager Telecom BIJAPUR reserves the right to reject any or all the tender applications without assigning any reasons. No complaint in this respect will be entertained.
22. The BSNL will be at liberty to award the work to any number of contractors at the accepted rates depending upon the exigency/ work load.
23. Bills in triplicate duly pre-receipted should be submitted to the concerned SDOs/SDEs after spot inspection by SDOs / SDEs or his authorized representative and their certifying the bills and counter signature by competent authority for settlement of bills.
24. The BSNL reserves the right to carry out work in any manner if it so desires.
25. The General Manager Telecom BIJAPUR is not bound to accept the lowest tender.
26. The contractor should observe all labour regulations while employing his labourers. No labourer below the age of 18 years shall be employed in the works. The contractor shall be responsible for issuing protective devices like AC line tester, rubber hand gloves, shoes with rubber soles, safety belt, safety helmet etc. to the labourers working under him while on work. He should also ensure to take power shutdowns wherever and whenever necessary with the guidance of the controlling officer.
27. The contractor shall at his own responsibility arrange to get necessary license required under " Contract Labour(Regulation and abolition) Act 1970 and to abide by the provisions of the said Act.

28. The contractor shall at all times hold the BSNL safe and indemnify against all claims, cost, charges and expenses for which the BSNL may be liable or may incur or pay on account of the negligence or misconduct of the contractor or his servants or any person under his control whether the injury to the person or damage.
29. While carrying out of laying U/G cable works, if any injury or death caused to any labourer, the cost of compensation should be borne by the contractor only.
30. The contractor shall take all precautions while carrying out of laying U/G cable works. He should make all necessary arrangements for stay at work place and provide hygienic and good sanitation for the labourers.
31. A log book will be kept at the work site. All observations and instructions will be recorded therein. The contractor is required to note the contents which will also be verbally explained to the representative of the contractor at the work site. The contractor will however be responsible to note all such remarks, instructions etc.
32. The contractor should intimate the name of the persons who are working under him in any capacity or subsequently employed by him and who are near relatives of the officers of the BSNL.
33. Tents and tools will not be supplied to the contractor for the execution of ordered works.
34. The contractor should provide proper danger light signals wherever necessary at busy roads or crosses. For any mishaps occurring the contractor is liable for it.
35. The contractor shall be able to execute the works in more than four or five locations simultaneously by keeping adequate number of persons at his disposal for special executions of the same
36. The contractor shall not assign or sublet the contract or any part thereof.
37. The contractor shall observe all the relevant rules concerning to his workmen employed by him in carrying out the works and pay any compensation to the workmen payable under the workmen compensation Act 1923 for injuries or disability or death caused in the process of execution of the work. The BSNL is in no way responsible for the labour / any others employed by the contractor for carrying out the jobs ordered by the BSNL
38. Contractors who have near relatives posted as gazetted officers in Karnataka circle and Telecom District Bijapur in particular or in the subordinate offices thereto are not permitted to tender against this notice inviting tenders. No one connected with or in the employment of BSNL shall ever be admitted as a partner of the contractor.
39. The normal working hours shall be between 9 AM to 6 PM on all working days. It is for the contractor to work longer or carry on work at night in case of urgency.
40. The General Manager Telecom Bijapur may terminate this agreement at his option any time by giving 7 days notice and without assigning any reason. In case of bad work, the General Manager Telecom, Bijapur may rectify the same and have it replaced deducting the value of the work rejected or the cost of replacing the same as he may think proper from any amount due to the contractor making this tender. In the event of any damage sustained by the BSNL due to unsatisfactory execution or delay in carrying out the work by the selected contractor, the General manager Telecom , Bijapur will decide forfeiting the security deposit and entitled to recover the cost of damage. To assess the cost of damage, the decision of the General Manager Telecom Bijapur shall be final. The General Manager Telecom Bijapur reserves to himself the right to forfeit the entire security deposit or such portion thereof as he may think fit for improper works carried out by the contractor.
41. The work should be carried out to the satisfaction of the G.M.T Bijapur or his representative authorised on his behalf . The G.M.T Bijapur can reject payment for any part of the work not carried out as per the BSNL standards.
42. Company is not liable for additional works carried out without previous sanction. Company will not be liable for any additional works which have not been provided for in the work or estimate but carried out by the party tendering without previous sanction of the officer who has accepted the tender.

43. Rates for items in the tender will remain fixed for the period of contract. Rates of any other item not covered in the schedule should be settled in advance before taking up the work. It is hereby agreed that if G.M.T Bijapur makes any alterations in the original design, drawing or specification that may be considered necessary during the progress of the work outside the schedule of the rates be required to be done, the rate must be settled in writing before such work is commenced.
44. While carrying out work on any existing cable routes, the tenderer should ensure least interruption to the working cable. The GMT Bijapur is empowered to cancel the tender or impose any penalty on the tenderer for not following this condition at any time.
45. In the event of the contractor failing to observe or perform any of the conditions of the work as shown in the tender in the above paras, security deposit (EMD + Additional security Deposit) furnished by him will be forfeited without prejudice to any other right of the company.
46. The bills (Running/final) complete in all respects submitted by the contractor after 30 days of completion of work along with AT are liable for penalty at the rate of 0.25% of the amount of the bill for every week of delay subject to maximum of 5% of the amount of the concerned bill.
47. The bills (Running/Final) complete in all respects submitted by the contractors after six months of completion of A/T will be treated as invalid and no payment will be made on them. However in exceptional cases, payment will be authorised with applicable penalties mentioned in the bid documents by the Heads of SSA only, after detailed investigation and on appeal by the contractor.
48. Conditions mentioned in the tender notices are part of the agreement in the "ANNEXURE -I" executed on a non- judicial stamp paper of Rs.100/-
49. While digging, no damage should be done to the existing BSNL cable or the cable of other agencies. Instances of such damaging / spoiling of the cable will be noted and such contractors will be ineligible for future tenders.
50. The tenderer will have to submit following documents / deposits with the tender application. Any tender document not accompanying the below mentioned documents / deposits will be liable to be rejected.
 - i) EMD in accordance with tender document.
 - ii) Tender document(s) in original duly filled and signed by tenderer or his authorised representative along with seal on each page. All corrections and overwriting must be initialed with date by the tender or his authorised representative.
 - iii) The registration of firm, authenticated copy of partnership deed in case of partnership firm.
 - iv) Original "Power of attorney in case person other than the tenderer has signed the tender document.
 - v) Experience certificate as per clause 1 (One) of NIT issued by an officer not below the rank of DE of BSNL, any other BSNL / PSUs which is mandatory.
 - vi) Enlistment certificate from BSNL or other BSNL if enlisted.
 - vii) DD for cost of bid document in case of tender downloaded from website.
 - viii) Copy of the PAN card issued by the Income Tax BSNL .
 - ix) The registration certificate with EPF (compulsory)

51. RATES OF EMPTY CABLE DRUMS : The tenderer while executing the cable works should dispose off the empty cable drums themselves in lieu of which the fixed rates of empty cable drums will be deducted from the contractor's bills.

Sl. No.	Size of drum	Rate of disposal
1	1200 Pairs and above	Rs. 550.00
2	800 Pairs	Rs. 500.00
3	400 Pairs	Rs. 375.00
4	200 Pairs	Rs. 250.00
5	100 Pairs	Rs. 150.00
6	50 Pairs	Rs. 125.00
7	20 Pairs	Rs. 100.00
8	10 Pairs	Rs. 075.00
9	5 Pairs	Rs. 075.00
10	OFC cable drums	Rs 200.00

Note : These are fixed rates and no variations shall be acceptable from these rates.

52 ISSUE OF WORK ORDERS AND TIME LIMIT :

52.1 The work order shall be issued so as to include all items of works of one or more primary cable(s) in large exchange system (MDF to pillar and/or pillar to DPs) or for entire exchange area in case of small and medium exchanges. The idea behind issuing work orders in this way is to ensure that the network becomes ready from MDF to Pillar and/or Pillar to DPs for release of connections on completion of works entrusted against the work order. This makes it possible for ensuring end-to-end testing of cable pairs. The contractor shall organise the work in such a way so as to deliver meaningful output of requisite quality within shortest possible time. If there is a trench common to number of primary cables works, which are to be given in different work orders, the common trench may be given in one work order and in other work orders only laying of cables in that common trench and other works shall be mentioned. The work shall be taken up in such a way that cable are available from MDF to Pillar or Pillar to DP in a shortest possible time.

53.1 The work orders shall be issued by the Sub Divisional Engineer In-charge of cable construction works after examining the technical and planning details of the works to be executed.

53.2 The Sub Divisional Engineer shall mention the time limit to execute the work order after seeing the quantum of work and store availability position.

53.3 The BSNL reserves the right to cancel or modify the scope of work stipulated to be carried out against the work order in the event of change of plan necessitated on account of technical reasons or in the opinion of work order issuing authority or the head of SSA, the contractor is not executing the work at the required pace.

54 EXTENSION OF THE TIME LIMIT :

54.1 General

54.1.1 In each work order, the work order issuing authority shall specify the time allowed for completion of work consistent with the magnitude and urgency of work. The time allowed for carrying out the work is to be strictly observed by the contractor and shall be reckoned from seventh day from the date of issue of work order.

54.2 Application for extension of the Time and Sanction of Extension of Time (EOT) :

54.2.1 There may be some hindrances, other than covered under force majeure, while execution of work and in such cases the contractor shall apply in writing in the prescribed form (Part-A) to the engineer-In-charge for extension time (EOT), on account of which he desires such extension within three days of occurrence of hindrance. The Engineer-In-charge shall forward

the request to the competent authority (an Officer of the rank of JAG level in-charge of cable construction work) with his detailed report and photocopy of the hindrance register, in the prescribed form (Part-B) within three days of receipt of request from the contractor.

54.2.1.1 The application contains the ground(s), which hindered the contractor in execution of work.

54.2.1.2 The engineer in-charge is of the opinion that the grounds shown for extension of time are reasonable.

54.2.2 The competent authority shall consider the request keeping all the facts & circumstances in view and shall grant extension of time, if in his opinion, there are reasonable and sufficient grounds for granting such extension and the reasons for delay are not ascribable to the contractor

54.2.3 The competent authority may also grant extension of time for completion of work in cases where reasons for delay are ascribable to the contractor, but such extension of time shall be with LD charges as per clause dealing with penalty for delays in execution of works. The extension of time with LD charges shall be issued under the signature of JAG level Telecom Officer competent to grant the extension of time.

54.2.4 If the competent authority, is of the opinion that the grounds shown by the contractor are not reasonable and sufficient and declines to grant the extension of time, the contractor cannot challenge the soundness of the opinion by reference to arbitration. The decision of the competent authority on period of extension of time or refusal for extension of time shall be final and binding on the contractor.

54.3 Grant of extension of time without application :

54.3.1 There are, at times, practical difficulties the non availability of materials, delay in providing permissions/right of way etc. reasons for which are ascribable to the BSNL. In such cases, the Engineer In-charge with the approval of competent authority to sanction EOT, may issue extension of time suo moto without waiting for contractor to make an application for EOT. Entry of hindrances shall be made in the hindrance register. The BSNL will however, not be liable to the contractor for any losses or damages, costs, charges or expenses that the contractor may in any way sustain/suffer due to delay in making the above available.

55 MEASUREMENT, INSPECTION, TESTING AND ACCEPTANCE TESTING :

55.1 Measurement

55.1.1 The measurement books are to be maintained by the Officer in-charge of the work or his immediate subordinate not below the rank of Junior Telecom officer. The entry shall be made in ink. No entry shall be erased. If a mistake is made, it should be corrected by crossing out the incorrect words or figures and inserting the corrections, the corrections thus made shall be initialed & dated by the officer concerned.

55.1.2 Responsibility of taking and recording measurement : The measurement of various items of work shall be taken and recorded in the measurement book issued with each work order. The measurement shall be taken and recorded by an officer not below the rank of Junior Telecom Officer, supervision the work. The Junior Telecom Officer/Sub Divisional Engineer directly responsible for supervision of work, shall be responsible for accuracy pf 100% of measurements. The Sub Divisional Engineer where Junior Telecom Officer is supervising officer shall be responsible for conducting test check of 20% of measurements. The Divisional Engineer shall be responsible for conducting test check of 10% of measurements.

55.1.3 Method of recording of nomenclature of items : Complete nomenclature of items, as given in the agreement need not be reproduced in the measurement book for recording the measurements but corresponding item code as provided, shall be used.

55.1.4 Method of measurements : The measurements of the work shall be done for activity-wise as and when the item of work is ready for measurement. The methods of measurement of various items are enumerated as under –

- Measurement of depth of trenches

The cable routes of one work order shall be divided into a number of segments each of maximum 100 meters length bounded by identifiable landmarks at both the ends of the segments. If landmarks are not available, length of segment may be maintained at 100 meters. One segment shall cover only one type of trench. The measurement of depth shall be recorded at each point of measurement (POM) in the measurement book in meters up to two decimal points. For example, 97cms depth shall be recorded as 0.97m. The points of measurements shall be at a distance of 10 meters starting from 0 (zero) meter. For example, if length of segment is 75 meters, the POMs shall be at 0M, 10M, 20M 30M, 40M, 50M, 60M, 70M. The last POM shall be at 75th M to be recorded against residual POM. For each segment average depth shall be worked out by dividing the total depth by number of POMs. The measurement of depth be recorded in measurement book.

The efforts required to excavate trenches is not proportionate especially with reference to depth. Therefore, normally the workers tend to dig shallow trenches. As standard depth of the trench is important for future life and protection of cables, this tendency has to be discouraged. In order to encourage the contractor to achieve best possible depth in the face of the constraints, the following scale of payment shall be applied for digging of lesser depths, subject to condition that relaxation has been granted by the competent authority for lesser depths.

For Other than 5 Pair cable		For 5 pair cable only	
Depth between	Rate applicable as % of approved rates	Depth between	Rate applicable as % of approved rates
90 to 99 cms.	Proportionate of approved rates	40 to 59 cms	Proportionate of approved rates
80 to 89 cms.	Proportionate of approved rates	30 to 39 cms	50 % of approved rates
70 to 79 cms.	Proportionate of approved rates	20 to 29 cms	40 % of approved rates
60 to 69 cms.	Proportionate of approved rates	Below 20 cms	NIL
50 to 59 cms.	50 % of approved rates		
40 to 49 cms.	40 % of approved rates		
30 to 39 cms.	NIL		
20 to 29 cms.	NIL		
10 to 19 cms.	NIL		
Below 10 cms.	NIL		

For OFC cable	
Depth between	Rate applicable as % of approved rates
100-164 cms.	Proportionate of approved rates
Below 100 cms.	60 % of approved Rate

- Measurement of length & Profiles of strata and protection
The measurements of length of trenches are on running meter basis for particular category of surface strata viz, non-surfaced strata irrespective of type of soil encountered while digging.

The length of trenches dug in different strata in a segment shall be measured and recorded item code-wise in the measurement book. The segment length from POMs and total of item code-wise length should match.

- Measurement of length of cable – The length of cables laid in trenches, through pipes and through ducts shall be measured by use of RODO meter/Measuring tape. The length should be cross verified with the marking of length on the cables. The lengths shall be recorded in sheet provided in the measurement book.
- Measurement of other items – The measurement / numerical details of other items shall be recorded in the sheets provided for respective items viz.
 - Erection, Termination, Painting and Sign writing of D.Ps.
 - Construction of plinths and erection, painting and sign writing of pillars.
 - Termination of cable on MDF and Pillars (Primary cables)
 - Termination of cable on MDF and Pillars (Distribution cables)

55.1.5 The contractor shall sign all the measurement recorded in the measurement book. This will be considered as an acceptance by the contractor of measurements recorded in the MB. In case contractor fails to attend at the measurements or fails to countersign or to record the difference within week, then in any such events the measurements taken by Engineer In-charge or by the subordinate as the case may be shall be final and binding on the contractor and the contractor shall have no right to dispute the same.

55.1.6 The Divisional Engineer before passing the bill for sections covered by each set of measurement may carry out test check by re-opening trench at as many locations as necessary as specified in document procedure for underground cable construction and bills will be passed only when he is personally satisfied of the correctness of entries in the measurement book and also when he is satisfied of other aspects of the work as per the terms and conditions of the contract. The contractor shall provide the necessary assistance of labour for re-opening of trench for test check by Divisional Engineer> Separate payment shall not be made to the contractor for excavation of such test checks, however such test pits shall not be more than 10% of the cable laying work.

55.1.7 Measurement of the work of cable pulling through pipe/duct will be taken equal to the length of the pipe/duct through which the cable has been pulled and not the total length of the cable pulled through pipe/duct.

55.2 Inspection and Quality control :

55.2.1 The quality of work – The importance of quality of U/G cable construction works cannot be over-emphasized. The quality of Telecom services largely depends on the quality of external plant of which U.G. cable component covers the major portion. The U/G cable are vulnerable to damages due to work of other agencies.

55.2.2 The quality of UG cable plant depends upon the quality of individual items of work involved viz. Depth of cables laid, care while paying and laying, Protection, Jointing of cables and Termination on MDF, Pillars & DPs and at last but not least on documentation of cable network. In order to ensure quality in cable construction work, each component of work need attention. The work shall be carried out strictly in accordance with specifications laid down to achieve the requisite quality aim.

55.2.3 It is imperative that the contractors are fully conversant with the construction practices and shall be fully equipped to carry out the work in accordance with the specifications. The contractors are expected and bound to ensure quality in construction works in accordance with specifications laid down.

The contractor shall engage adequate and experienced supervisors to ensure that works are carried out as per specifications and with due diligence and in a professional manner. The

contractors shall satisfy himself/themselves that the work conforms to the quality specifications before offering the same to A.T. wing for Acceptance Testing.

An assessment of extent of interest shown by the contractors in executing the works with requisite quality shall be recorded and used in evaluating the Contractors' Performance Rating (CPR).

55.2.4 In addition to Acceptance testing being carried out by A.T. wing and supervision by Construction Officers, all works at all times shall be open to inspection of the BSNL. The contractors shall be bound, if called upon to do so, to offer the works for inspection without any extra payment.

55.2.5 Site Order Book : The site order book is one of the primary record to be maintained by the JTO supervising the work during the course of execution of works. The noting made by Officers as well as Contractors will form as basis for operation for many contractual clauses. The contractor shall remove all the defects pointed out by the BSNL in the site order book. The site order book is to be maintained in the prescribed format. The contractor or their representatives shall also be at liberty to note their difficulties etc. in these books. The site books shall invariably be consulted at the time of making final payments to the contractor.

55.3 Testing and Accepting Testing :

55.3.1 The work shall be deemed to have been completed only after the same has been accepted by the A.T. Officer. The contractor shall make test pits at the locations desired by A.T. Officer for conducting test checks without any extra payment. The contractor shall restore the pits after test measurements to its original shape. The contractor shall be responsible to provide test/measurement tools and testers for conducting various tests.

55.3.2 Scope of Acceptance and Testing : The purpose of acceptance and testing is to verify integrity of measurement and quality of work done. The A.T. officer shall not be responsible for recording of measurements for the purpose of billing and contractual obligations. However, if the measurements taken by A.T. officer are found to be lesser than the measurements recorded by the officer responsible for recording the measurements, the measurements taken by A.T. officer shall prevail without prejudice to any punitive action against the contractor as per provisions of the contract and the officer recording the measurements. The contractor shall be obliged to remove defects/deficiencies pointed out by the A.T. officer without any additional cost to the BSNL.

55.3.3 Offering the work for acceptance and testing : The Sub Divisional Engineer responsible for construction, after having satisfied himself for completion of work ready for A.T., shall offer the work to A.T. officer for conducting Acceptance & Testing. The work shall offered for A.T. as soon as work of primary cable from MDF to Pillar or work of distribution cable from Pillar to DPs, are completed in all respects. The work against any work order can be offered for A.T. in a number of such stages.

55.3.4 The contractor shall provide labour, if demanded by the A.T. officer for digging of test pits and other necessary infrastructure for carrying out the A.T. work. No extra payment will be made for the digging of test pits.

56 WARRANTY :

56.1 If it becomes necessary for the contractor to replace or renew any defective portion/portions of the material under this clause, the provisions of the clause shall apply to the portion/portions material so replaced or renewed or until the end of the above mentioned period of twelve months, whichever may be later. If any defect is not remedied within a reasonable time, as prescribed by the BSNL, the BSNL may proceed to do the work at the contractor's risk and costs, but without prejudice to any other rights which the BSNL may have against the contractor in respect of such defects.

56.2 *The cable laid shall be guaranteed for a period of ONE year from the date of closing joint.* In case failure of the joint due to poor workmanship i.e. failure of joint without external damage, within the stipulated period of guarantee the contractor shall repair the joint(s) at his own cost within 24 hours of informing him, *failing which the BSNL may carry out the repairs and penalty equivalent to five times of the approved rate of the jointing work* plus the cost of materials used shall be recovered from the contractor from his pending bills/SD or any amount due to him without prejudice to any other action as per terms and conditions of the tender. The cost of jointing kit, supplied by the BSNL, so used to revive the joint shall be deducted from the running bills of the contractor pending for payment or from security if all bills have been settled.

56.3 Replacement under warranty clause shall be made by the contractor free of all charges at site including freight, insurance, cost of works and other incidental charges.

57 PAYMENT TERMS

57.1 Procedure for preparation and settlement of bills ::

57.1.1 The work order shall contain work of one or more primary cables and/or distribution cable works of one or more pillars. As stated earlier the work has to be organised in such a way so that the cables are available for release of connections at the earliest and in line with this thinking the contractor should carry out the works in a systematic manner either of a primary cable or a number of primary cables on the same route or distribution cables of a pillar in one stretch. All items of work involved in this unit of work (MDF to pillar and Pillar to DP) shall be completed in all respect before preferring the bills for the work. The provision of running bill has been made to make it easy for the contractor to manage his cash flow and to complete the work systematically and meaningfully in a shortest possible time. The procedure for preparation of running and final bills is enumerated as under

57.1.1.1 Procedure for preparation, processing and payment of running bills :

The contractor shall prepare the running bill in triplicate ensuring execution of part work in its completeness as envisaged above, correctness of rates and quantum of work and submit the bills to SDE In-charge of work. The bills shall be prepared accurately and as per measurements recorded in the measurement book and after acceptance and testing of all the items involved in the work. The contractor should submit the running bill within 10 days of acceptance and testing. The SDE In-charge shall record the certificate on the running bill that the site order books have been consulted before signing the running bills. This would enable the SDE to ensure whether the defects pointed during execution have been rectified or not. The SDE In-charge of work shall scrutinize the bills and accord necessary certificate and submit the running bills with the documents as mentioned below to the Divisional Engineer In-charge of work.

- ◆ First copy of the bill with first copy of measurement sheets of measurement book and A/T reports. (Payable copy)
- ◆ Second copy of the bill with second copy of measurement sheets of measurement book and A/T reports. (Not for payment)
- ◆ Third copy of the bill with photo-copies of measurement sheets and A/T reports. (Not for payment)

57.1.1.2 The Divisional Engineer shall exercise the prescribed checks to the bills and accord necessary rectification on the bills. The Divisional Engineer shall retain the third copy in record and record it in the estimate file maintained in his office and send first and second copies with all documents to Work section of Planning cell for processing of bills and release of payment.

57.1.1.2.1 The work section of planning cell shall process the bills in the estimate file of the concerned work and scrutinize the bills vis-à-vis work order issued, sanctioned provisions in the estimate etc. The bill shall be passed after necessary scrutiny by works section, by the officer competent to pass the bill. Against any running bill, payment to the extent of only 90% shall be made which shall be treated as on advance to the contractor. 7.50% of

the bill amount towards performance security deposit and statutory taxes as applicable to contract shall be deducted at the time of payment from each running bill. Account payee cheque for the amount passed in the bill will be issued only ,after the contractor gives stamped receipt for the amount, if the bills are not pre-receipted. Details of payment of all the bills shall be entered into contractors ledger by Works section of the Planning cell.

57.1.1.3 In exceptional cases where work required for preferring a running bill cannot be completed within reasonable time due to non availability of stores or any other reason and where the BSNL is responsible for delay, the concerned DGM may permit payment of running bill (prepared without completing the work end to end for that unit of work) to the extent of 70% so that the contractor does not face resource crunch. Such payment shall be treated as an advance payment to the contractor like any other running bill.

57..1.2 Procedure for preparation, processing and payment of Final bill : The contractor shall prepare the final bill in triplicate after completion of the entire work entrusted against the work order and acceptance and testing of all the works and submit the same to SDE In-charge of work within 15 days of acceptance and testing. The final bill shall be prepared for all the measurement of all items involved in execution of complete work order. The contractor shall prepare the final bill containing the following details –

- The bill for all the quantities as per measurements at the approved rates.
- Adjustment of amount received against running bills.
- Adjustment of performance security deposit and statutory taxes already recovered.
- Store reconciliation statement furnishing account of stores received against the work order and returned to the designated store go-down as surplus with requisite verifications from store in-charge/ SDE In-charge of work.
- Letters of grant of E.O.T(s), if work could not be completed within stipulated time.
- Six sets of bound documentation.
- Test certificate of bricks.

57.1.2.1.1 The SDE In-charge of work shall scrutinize the final bill against the works entrusted and accord necessary certificate stating that the work has been executed satisfactorily in accordance with specifications and terms and conditions of the contract. The SDE shall verify the quantities of items of work with reference to measurements recorded in the measurement book (an also A/T reports incase of any deviation noted by A/T officer) The SDE In-charge of work shall submit the final bills along with other documents mentioned above with the documents as mentioned hereunder to the Divisional Engineer In-charge of work.

- ❖ Bills prepared by the contractor.
- ❖ Material reconciliation statement.
- ❖ Measurement book.
- ❖ A/T certificates.
- ❖ The site order book.
- ❖ The hindrance register.
- ❖ Details of recoveries/penalties for delays, damages to BSNL/Third party properties as per provisions of the contract. Incase no recovery is to be made, NIL report needs to be submitted.
- ❖ Details of empty cable drums cost of which needs to be recovered from the bill.

57.1.2.1.2 The Divisional Engineer shall exercise the prescribed checks on the bills and accord necessary certificates on the bills. The Divisional Engineer shall retain the third copy of the bill along-with photocopies of other documents not available to his estimate file and send first and second copies of the bills, measurement book and other documents submitted by SDE, along-with the bills as above to Work section of the Planning cell for processing and final payment.

57.1.2.1.3 The work section of Planning cell shall process the bill in the estimate file of the concerned work and scrutinize the bills vis-à-vis work order issued, sanctioned provision in the estimate etc. The work section shall scrutinize bill who recover all the liabilities of the contractor and statutory taxes besides 10.0 % payment against security deposit. The bill shall be passed, after necessary scrutiny by works section to the Officer competent to pass the final bill.

57.2 Procedure for Payment for sub standard works

57.2.1 The contractors are required to execute all works satisfactorily and in accordance with the specifications. If certain items of work are executed with unsound, imperfect or unskilled workmanship or with materials of any inferior description or that any materials or articles provided by him for execution of work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract (referred to a substandard work hereinafter), the Divisional Engineer In-charge of shall make a demand in writing specifying the work, materials or articles about which there is a complaint .

57.2.2 Timely action by Construction Officers : Timely reporting and action to a great extent, can prevent recurrence of sub standard work, which will be difficult or impossible to rectify later on. It is incumbent on the part of Construction Officers to point out the defects in work in time during progress of the work. The Junior Telecom Officer/Sub Divisional Engineer responsible for execution and supervision of work shall without any loss of time submit a report of occurrence of any sub standard work to the Divisional Engineer IN-charge besides making an entry in the site order book. A notice in respect of defective work shall be given the contractor to rectify/replace /remove the sub standard item of work and also definite time period within which such rectification/removal/replacement has to be done. After expiry of the notice period, of the contractor fails to rectify/replace/remove the sub standard items, the defects shall be got rectified/replaced/removed BSNLally or through some other agency at the risk and cost of the contractor.

57.2.3 Non reporting of sub standard work in time on the part of Construction Officer(s) shall not in any way entitle the contractor to claim that the defects were not pointed out during execution and as such the contractor cannot be absolved of the responsibility for sub standard work and associated liabilities.

57.2.4 Authority and procedure to accept sub standard work and payment thereof : There may be certain items of work pointed out as sub standard which may be difficult to rectify and in the opinion of the Head of SSA, the items in question will not materially deteriorate the quality of service provided by the construction, the head of SSA shall appoint committee to work out the reduced rates payable to the contractor for such sub standard work. The committee shall constitute one Divisional Engineer other than the one who is directly in-charge of Cable construction involving sub standard item of work , as Chairman and one SDE(planning) and an Accounts Officer as members. The committee shall also take into account the approximate cost of material/work pointed out as sub standard and recommend the rates payable for sub standard work which shall not exceed 60% of the approved rates of the item in question.

57.2.5 Record of sub standard work : The item adjudged as sub standard shall be entered into the measurement book with red ink.

58 PENALTY CLAUSE:

58.1 Delays in the contractor's performance:

58.1.1 The time allowed for completion of the work as entered in the tender shall be strictly adhered by the contractor and shall be deemed to be the most important aspect of the contract on the part of the contractor and shall be reckoned from seventh day from issue of work order by the BSNL. The work shall, throughout the stipulated period of contract, be proceeded with all due diligence to achieve the desired progress uniformly and the contractor shall pay as penalty an amount equal to 0.25 percent of the estimated amount per day of delay in completion of work, subject to a maximum of 10(ten) percent of the cost of the work awarded.

58.1.1 On any date the penalty payable as above, reaches 10(ten) percent of the estimated cost of the work, the contractor should proceed with the work further only on getting a written instructions from the Divisional Engineer that, he is allowed to proceed further with the work. It will be in the discretion of the Divisional Engineer to allow the contractor to continue with the work on the basis of any written agreement reached between the contractor and the Divisional Engineer one of the conditions of such agreement may be a stipulation for the contractor to agree for realisation of penalty for delay at a higher rate as may be agreed between the Divisional Engineer and contractor.

58.1.2 Penalty for delay in completion of the work shall be recoverable from the bills of the contractor and / or by adjustment from the security deposit or from the bills of any other contract. However, adjustment from security deposit will be made only when the contract has been terminated or at the time of final settlement of this on completion of work.

58.1.3 In case of slow progress of the work in a section which have been awarded to a particular contractor, and the public interest does not permit extension of time limit for completion of the work, the General Manager Telecom will have the full right to order that the scope of the contractor may be restricted to such fraction of the whole of the work and get the balance executed at the risk and cost of the contractor. The details are given in Rescission of the contract clause of the bid document. All such payments shall be recovered from the contractor's pending bills or security deposit.

58.1.5 The General Manager Telecom reserves the right of cancel the contract and forfeit the security deposit if the contractor fails to commence the work within 7 days after issue of the work order.

58.2 Penalty for causing inconvenience to the Public :

58.2.1 To ensure progress during the execution of work and to cause minimum inconvenience to the public, the contractor shall not dig a trench of more than 200 meters at a stretch in a route at a time. He shall cause to lay cable and close such trenches expeditiously. Under any circumstances a stretch of trench of maximum 200 meters shall not be kept open for more than 4 days in case of cable laying by digging paved surfaces. In the event of contractor failing to comply with these conditions, a penalty of recovery up to Rs. 300/- per day the trench is kept open beyond the time limit allowed may be imposed by the BSNL. The penalty will be addition to that payable for delay or slow work.

58.2.2 The contractor shall not be allowed to dump the empty cable drums/waste materials in Govt/public place, which may cause inconvenience to Govt/public. If the contractor does not dispose off the empty cable drums/waste materials within 3 days of becoming empty, the BSNL is at liberty to dispose off the drums in any manner deemed fit and also recover the amount fixed in this contract for empty cable drums/waste materials from the bill/security deposit/along with the cost incurred by the BSNL in disposing off such materials. The BSNL may also levy a penalty up to Rs. One thousand for each such default.

58.3 Penalty for cutting/damaging the old cable :

58.3.1 During excavation of trench utmost care is to be taken by the contractor so that the existing underground cables are not damaged or cut. In case any damage/cut is done to the existing cables, a penalty as per the schedule given below will be charged from the contractor or the amount will be deducted from his running bills –

Size of existing cables cut/damaged	Amount of penalty per cut/damage
Up to 100 Pairs cable	Rs. 0500.00 (Five hundred)
Above 100 Pairs & up to 400 Pairs	Rs. 1000.00 (One thousand)
Above 400 Pairs	Rs. 2000.00 (Two thousand)
OF Cable of any size	Rs 5000.00(Five thousand)

Besides the above penalty, the contractor shall carry out such repairs for restoration of the damaged cable free of charge. The cost of jointing kit shall also be borne by the contractor, If contractor fails to repair the damage, the cost of repair(including cost of labour + Jointing kit) shall be recovered from the contractor.

58.4 Penalty to damage stores/materials supplied by the BSNL while laying :

58.4.1 The contractor while taking delivery of materials supplied by the BSNL at the designated place shall thoroughly inspect all items before taking them over. In case of execution of the work, if any material is found damaged/working unsatisfactorily, then a penalty equivalent to the cost of material + 10% as penalty shall be recovered from the contractor's payments/securities.

58.4.1 In case of damage to PIJF cables, while laying, the cost of number of pairs damaged (including laying charges, transportation/storage charges) adding 10% as penalty shall be recovered from the contractor's bill/securities.

58.4.2 However, contractor will not be penalised for any defect in workmanship of the materials, which shall be taken up separately with the supplier of the stores.

58.5 Penalty for delayed submission of bills

58.5.1 "The bills (running/final) complete in all respect submitted by the contractor beyond the prescribed period mentioned in the previous clauses are liable for penalty at the rate of 0.25% of the amount of the bill for every one week of delay subjected to maximum of 5% of the amount of the concerned bill"

58.5.2 " The bills (Running/Final) complete in all respect submitted by the contractor after six months after completion of A/T, will be treated as invalid and no payment will be made on them. However in exceptional cases payment will be authorised with applicable penalties mentioned in the bid document by the head of circles only, after detailed investigation & on appeal by the contractor

59 Cancellation of Contract

59.1 Circumstances for cancellation of contract

Under the following conditions the competent authority may cancel the contract :

- If the contractor commits breach of any item of terms and conditions of the contract.
- If the contractor suspends or abandons the execution of work and the engineer in-charge of the work comes to conclusion that work could not be completed by due date for completion or the contractor had already failed to complete the work by that date.
- If the contractor had been given by the Officer in-charge of work a notice in writing to rectify/replace any defective work and he/she fails to comply with the requirement within the specified period.

59.2 Upon cancellation of the contract, the security deposit of the contractor shall be liable to be forfeited and shall be absolutely at the disposal of the BSNL as under –

59.2.1 Measurement of Works executed since the date of last measurement and up to the date of rescission of contract shall be taken in the presence of the contractor or his authorized representative who shall sign the same in the MB. If the contractor or his authorized representative do not turn up for joint measurement, the measurement shall be taken by the officer authorized for this purpose after expiry of due date given for joint measurement. The measurement taken by the officer so authorized shall be final and no further request for joint measurement shall be entertained.

59.2.2 The unused material (supplied by the BSNL) available at site, shall be transported back by the BSNL to the Telecom store at the risk and cost of the contractor. If any such material is found damaged/lost then the penalty shall also be recovered from the contractor as per condition in tender documents/bid.

59.2.3 The unexecuted work shall be got executed through the qualified bidder from amongst the bidders, who participated in the bidding process, by giving them offers in their order of ranking (L2, L3, ----) at their quoted rates. If the work was awarded on single tender basis then the BSNL shall get the unexecuted work completed through any other contractor approved in (the SSA) at the approved rates of that particular section or to execute the work BSNL ally, as is convenient or expedient to the BSNL at the risk and cost of the contractor. In such a event no compensation shall be payable by the BSNL to the contractor towards any inconvenience loss that he may be subjected to as a result or such an action by the BSNL. In this regard the decision of General Manager Telecom in concurrence with IFA shall be final and binding. In all these cases, expenses which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him shall be borne and paid by the original contractor and shall be deducted from any money due to him by the BSNL under the contract or any other account whatsoever any where in the BSNL or from a security deposit.

59.2.4 The certificate of the Divisional Engineer in-charge of work as to the value of work done shall be final and conclusive against the contractor, provided always that action shall only be taken after giving notice in writing to the contractor.

59.3 Termination for insolvency :

59.3.1 The BSNL may at any time terminate the contract by giving written notice to the contractor without compensation to contractor, if the contractor becomes bankrupt or otherwise insolvent as declared by the competent court provided that such termination will not prejudice or affect any right or action or remedy which has accrued or will accrue to the BSNL.

59.4 Optional termination by the BSNL (Other than due default of the contractor)

59.4.1 The BSNL may, at any time, at its option cancel and terminate the contract by written notice to the contractor, in which event the contractor shall be entitled to payment for the work done up to the time of such cancellation and a seasonable compensation in accordance with the contract prices for any additional expenses already incurred for balance work exclusive of purchases and/or whole of material, machinery and other equipment for use in or in respect of the work.

59.4.2 In the event of termination of the contract, the contractor shall forthwith clear the site of all the contractor's materials, machinery and equipment's and hand over possession of the work/operations concerned to the BSNL or as the BSNL may direct.

59.4.3 The BSNL may, at its option, cancel or omit the execution of one or more items of work under the contract and may part of such items without any compensation whatsoever to the contractor.

59.5 Issuance of Notice

59.5.1 The Divisional Engineer In-charge of work shall issue show cause notice giving details of lapses, violation of terms and conditions of the contract, wrongful delays or suspension of work or slow progress, to the contractor directing to take corrective action. A definite time schedule for corrective action shall be mentioned in the show cause notice. If the contractor fails to take corrective action within stipulated time frame, the Divisional Engineer in-charge shall submit a draft of final notice along-with a detailed report to the competent authority who had accepted the contract. The draft final notice shall be got legally vested from a BSNL Counsel.

59.5.2 The final notice for Cancellation of contract to the contractor shall expressly state the precise date and time from which the cancellation would become effective. The following safe guards shall be taken while issuing the final notice.

- a) During the period of service of notice and its effectiveness, the contractor should not be allowed to remove from the site any material/equipment belonging to the BSNL.
- b) The contractor shall give in writing the tolls and plants he would like to take away/remove from the site. Such of the materials as belong to him and which may not be required for future execution of balance work may be allowed by the Divisional Engineer in-charge of work to be removed with proper records.
- c) No new construction beneficial to the contractor shall be allowed.
- d) Adequate BSNL security arrangement in replacement of the contractor watch and ward shall be made forthwith. Expenses on this account are recoverable from the security deposit or any amount due to the contractor.

60 INDEMNITIES :

60.1 The contractor shall at all times hold the BSNL harmless and indemnify from against all action, suits, proceedings, works, cost, damages, charges, claims and demands of every nature and descriptions, brought or procured against the BSNL, its Officers and employees and forthwith upon demand and without protect or demur to pay to the BSNL any and all losses and damages and cost (inclusive between attorney and client) and all costs incurred in endorsing this or any other indemnify or security which the BSNL may now or at any time have relative to the work or the contractors obligation or in protecting or endorsing its right in any suit or other legal proceeding, charges and expense and liabilities resulting from or incidental or in connection with injury, damages of the contractor or damage, to property resulting from or arising out of or in any way connected with or incidental to the operations caused by the contract, documents. In addition the contractor shall reimburse the BSNL or pay to the BSNL forthwith on demand without protect or demur all cost, charges and expenses and losses and damages otherwise incurred by it in consequences of any claim, damages and actions which may be brought against the BSNL arising out of or incidental to or in connection with the operation covered by the contractor.

60.1 The contractor shall at his own cost at the BSNL's request defend any suit or other proceedings asserting a claim covered by this indemnity, but shall not settle compound or compromise any suit or other finding without first consulting the BSNL.

61 FORCE MAJEURE

61.1 If any time, during the continuance of this contract, the performance in whole or in part by either party or any obligation under this contract shall be prevented or delayed by reason of any war, or hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts, or act of God (herein after referred to as events) provided notice of happenings, of any such eventuality is given by either party to the other within 21 days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate this contract nor shall either party have any such claim for damages against the other in respect of such non- performance and work under the contract shall be resumed as soon as practicable after such event may come to an end or ceased to exit, and the decision of the BSNL as to whether the work have been so resumed or not shall be final

and conclusive, provided further that if the performance, in whole or part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 60 days either party may, at his option terminate the contract.

61.2 Provided also that if the contract is terminated under this clause, the BSNL shall be at liberty to take over from the contractor at a price to be fixed by the BSNL, which shall be final, all unused, undamaged and acceptable materials, bought out components and stores in the course of execution of the contract, in possession of the contractor at the time of such termination of such portions thereof as the BSNL may deem fit excepting such materials bought out components and stores as the contracts may with the concurrence of the BSNL elect to retain.

62 ARBITRATION

62.1 In the event of any question, dispute or difference arising under this agreement or in connection there with (except as to matters decision of which is specifically provided under this agreement) the same shall be referred to the sole arbitration of the General Manager, Telecom District BIJAPUR (GMTD BIJAPUR) or in case his designation is changed or his office is abolished then in such case to the sole arbitration of the officer for the time being entrusted whether in addition to the functions of the GMTD BIJAPUR or by whatever designation such officers may be called (hereinafter referred to as the said officer) and if the GMTD BIJAPUR or the said officer is unable or unwilling to act as such to sole arbitration or some other person appointed by the GMTD BIJAPUR. The agreement to appoint an arbitrator will be in accordance with the Arbitration and Conciliation Act 1996. There will be no objection to any such appointment that the arbitrator is BSNL servant or that he has to deal with the matter to which the agreement relates or that in the course of his duties as BSNL servant he has expressed view on all or any of the matter under dispute. The award of the arbitrator shall be final and binding on the parties. In the event of such arbitrator to whom the matter is originally referred, being transferred or vacating his office or being unable to act for any reason whatsoever such GMTD BIJAPUR or the said officer shall appoint another person to act as arbitrator in accordance with terms of the agreement and the person so appointed shall be entitled to proceed from the stage at which it was left out by the predecessors.

62.2 The venue of the arbitration proceeding shall be the office of the GMTD BIJAPUR or such other place as the arbitrator may decide. The following procedure shall be followed –

62.2.1 In case parties are unable to reach a settlement by themselves, the dispute should be submitted or arbitration in accordance with contract agreement.

62.2.2 There should not be a joint submission with the contractor to the sole Arbitrator.

62.2.3 Each party should submit its own claim severally and may oppose the claim put forward by the other party.

62.2.4 The onus of establishing his claims, will be left to the contractor.

62.2.5 Once a claim has been included in the submission by the contractor, a reiteration or modification thereof will be opposed.

62.2.6 The points of defence will be based on actual conditions of the contract.

62.2.7 Claims in the nature of ex-gratia payments shall not be entertained by the Arbitrator as these are not contractual.

62.2.8 The question whether these conditions are equitable shall not receive any consideration in the preparation of "points of defence".

62.2.9 If the contractor includes such claims in his submission, the fact that they are not contractual will be prominently placed before the Arbitrator.

The award of the sole Arbitrator shall be final and binding on all the parties to the dispute.

62.3 COURT JURISDICTION :

- (i) Any dispute arising out of the tender/bid document/evaluation of bids/issue of APO shall be subject to the jurisdiction of the competent court at the place from where the NIT/ tender has been issued.
- (ii) Where a contractor has not agreed to arbitration , the dispute/claims arising out of the contract /PO entered with him shall be subject to the jurisdiction of the competent court at the place from where contract/PO has been issued. Accordingly, a stipulation shall be made in the contract as under

“ This contract/PO is subject to jurisdiction of Court at BIJAPUR only”.

63) SPECIAL CONDITIONS OF THE CONTRACT:

Quality Of Work

63.1 The BSNL shall be the final judge of the quality of the work and the satisfaction of the BSNL in respect thereof set forth in the contract documents. Laxity or failure to enforce compliance with the contract documents by the BSNL and / or its representative shall not manifest a change or intent of waiver, the intention being that, notwithstanding the same, the contractor shall be and remain responsible for complete and proper compliance with the contract documents and the specification there in. The representative of General Manager Telecom BIJAPUR has the right to prohibit the use of men and any tools, materials and equipment which in his opinion do not produce work or performance meet the requirement of the contract document.

64 TAXES & DUTIES :

64.1 Contractor shall pay all rates, levies, fees royalties, taxes and duties payable or arising from out of by virtue of or in connection with and/or incidental to the contract or any of the obligations of the parties in terms of the contract documents and / or in respect of the works or operations or any part thereof to be performed by the contractor and the contractor shall indemnify and keep indemnified the BSNL from and against the same or any default by the contractor in the payment thereof.

65 PROTECTION OF LIFE AND PROPERTY AND EXISTING FACILITIES:

65.1 The contractor is fully responsible for taking all possible safety precautions during preparation for and actual performances of the works and for keeping the construction site in a reasonable safe condition. The contractor shall protect all life and property from damage or losses resulting from his construction operations and shall minimize the disturbance and inconvenience to the public.

65.2 If the excavation of trench alters the contours of the ground around road and highway crossing in such locations dangerous to traffic, the contractor shall at his own cost, take all necessary precautions to protect public and shall comply with all the BSNL regulations as to placing of warning boards (minimum size 3' X 2') , traffic signals, barricades, flags etc. at such location. If the contractor does not put the warning signal as per above directions, then a penalty of Rs. 500/- per day shall be levied on the contractor, till the directions are complied by the contractor. The contractor shall take due precautions to avoid damages to other pipe lines, water mains, sewers, telephones, telegraphs and power conduits, laid wires poles and guy wires, railways, highways, bridges or other underground or above ground structure and / or property crossing or adjacent to the cable trench being excavated.

65.3 Attention of the contractor is drawn to the rules regarding laying of cables at road crossing, along railway bridges, highways, safety precautions while working in public street,. The contractor in writing shall obtain the detailed engineering instructions from the Divisional Engineer of the area.

65.4 The contractor shall be solely responsible for location through approved non-destructive means and ensuring the safety of all existing underground pipeline, electrical cables and or other structure.

65.5 The contractor shall be solely liable for all expense for and in respect of repairs and / or damage occasioned by injury of or damage to such underground and above structures or other properties and under take to indemnify the BSNL from and against all actions, cause of actions, damages, claims and demands whatsoever, either in law or in equity and all losses and damages and costs (inclusive between attorney and client) , charges and expenses in connection therewith and/or incidental thereto. The contractor shall take all responsibilities and risk in crossing other pipelines and cables and shall be responsible for protecting all such existing pipelines, poles, electric lines, sewers, cables or other facilities from damage by the contractor's operation in connection with the work. The contractor without cost of the BSNL shall promptly repair any damage incurred.

65.6 The current market value of any commodities lost as a result of any damage to the aforesaid existing facilities shall be paid by the contractor together with such additional sum necessary to liquidate the personal or property damages, resulting there from.

66 ABOUT WELFARE MEASURE AND WORKMAN COMPENSATION :

66.1 Obtaining licence before commencement of work :

The contractor shall obtain a valid licence under the Contract Labour (R&A) Act 1970 and the Central Labour (Regulation & Abolition) central Rules 1971, before commencement of the work and continue to have a valid licence until the completion of work. The contractor shall also abide to the provision of the Child Labour (Prohibition & Regulation) Act 1986. Any failure to fulfill this requirement shall attract the penal provisions of this contract arising out of the resultant non-execution of work.

67 TOOLS & PLANTS :

The contractor shall provide at his own cost all tools, plants appliances, Implements etc. required for proper execution of works. The contractor shall also supply without charge the requisite number of persons with all means and materials necessary for the purpose of setting out works, counting, weighing, and assisting the measurements for examination at any time and from time to time. The contractor shall be responsible to make all arrangements, at his own cost for the watering of trenches/ducts and de-gasification of the ducts before carrying out work. The contractor shall also be responsible to make arrangements at his own cost for water required for carrying of works at sites including curing of CC/RCC works. Failing his so doing the same may be provided by the Engineer In-charge at the expense of the contractor and the expenses shall be deducted from any money due to the contractor under the contract or otherwise.

**ASST. GENERAL MANAGER(PLG)
O/O GMTD , BSNL BIJAPUR**

SECTION IV

FINANCIAL BID-PART I (For all cables other than 5 Pair)

FROM

TO,
The GENERAL MANAGER
Telecom District BIJAPUR

Sub:- Tender for underground cable construction works for 5 Pair , other than 5 Pair cable & OFC Maintenance works and other related cable works in BIJAPUR SSA for the year 2009-10

Ref. :-No: W-50/ Cable Tender /9 /2008-09 /3 dated @ BIJAPUR the 02-12-2008.

Dear Sir,

Having examined the tender documents, terms and conditions stipulated therein, specifications of work etc. we the undersigned offer to execute the cable construction works in conformity with the said specifications and conditions of contract at the following rates.

A)FOR OTHER THAN 5 Pair Copper cable Works :

Sl No	Name of the work	Unit	Rate excluding service Tax in Rs	
			In figure	In words
JOB- I (only labour charges to be quoted)				
01	Digging, trenching, filling back in stages By ramming to bringing to normal condition On assorted surfaces for Laying of new cablesOR for recovery of old Cables			
	a) Primary/Distribution Cable at the100Cms depth for all types of soils	Per Mtr		
	b) Road Crossing "Tarmac", filling back & bringing it to normal condition.	Per Mtr		
	c) Road Crossing "RCC", filling back & bringing it to normal condition	Per Mtr		
	d) Road Crossing through horizontal boring method & inserting GI pipes			
	i) Upto 100mm dia	Per Mtr		
	ii) 100mm to 150mm dia	Per Mtr		
	iii) 150mm to 300mm dia	Per Mtr		
02	Laying RCC/GI/HDPE/Hamilton tube pipe in road crossings including collar packing with cement and jute etc in trenches at S No 1(as per directions of field officer)			
	a) 150mm dia RCC Pipe	Per Mtr		
	b) 225mm dia RCC Pipe	Per Mtr		
	c) 65mm dia GI Pipe	Per Mtr		
	d) Sealing of both ends of RCC pipes with bricks	Each Op-eration		
	e) Placing semi circular RCC pipes OR Bricks/ as the case may be	Per Mtr		
03	Laying of cables in Trenches:-			
	a) up to 20Pairs	Per Mtr		

	b)50 to 100Pairs	Per Mtr		
	c)200-400Pairs	Per Mtr		
	d) 600-800 Pairs	Per Mtr		
	e) 1200 Pairs	Per Mtr		
04	Laying of UG Cable through Ducts			
	a) Up to 200Prs	Per Mtr		
	b) 400 to 800Pairs	Per Mtr		
	c) Beyond 800Pairs	Per Mtr		
05	Recovery of old cables from exposed/open Tren-ches & transportation to stores / nearest SDCA H Q	Per Mtr		
06	Miscellaneous			
	a) Recovery towards cost of empty cable drums retained by Contractors:-	Each		
	i) Cable drums up to 1 meter dia	Each		
	ii) Beyond 1 mtr dia note; empty cable drums will have to be disposed by contractor himself and he is supposed to quote the rate offered by him in the above			
JOB – II				
01	Cable jointing/Termination			
	a) Termination of conductor at CT Box in Pillar /MDF			
	i) up to 100 pair	Per Pair		
	ii) More than 100 pairs	Per Pair		
	b) Jointing and closing of joints			
	Jointing of cable with modular/UY connector	Per Joint		
	i) up to 100 Pairs	Per Joint		
	ii) 200 & 400 Pairs	Per Joint		
	iii) Beyond 400 Pairs	Per Joint		
	NOTE: The size of the joint shall be determined by the total primary side & distribution side cable pairs divided by two			
JOB – III				
01	Errection of DP poles including carriage of mater-ials (Two tubes, Socket etc.) to site and fitting,inc-luding digging pits & refilling,fixing of brackets etc.	Each		
02	Errection of DP on existing poles including termination at DP tags, fitting of GI pipes / brackets (2 nos) with rubber bush, clamps, saddle etc for each O/D DPs including Sign writing (DPs / pipes will be supplied)			

	a) 5 Pair O/D DP	Each		
	b) 10 Pair O/D DP	Each		
	c) 20 Pair O/D DP	Each		
03	Erection of Pillar : The plinth for erection of pillar Shall be made of RCC cast at site, the dimensions Of pillar i.e., its length & width + 30cms in excess should be the size of plinth & it should be erected at the depth of 110Cms including painting and sign writing			
	a) 1600/2000pr Pillar	Each		
	b) 800/1000pr Pillar	Each		
	c) 400/Mini Pillar	Each		
JOB- IV				
01	Supply of materials at site including all Taxes/ duties and freight.			
	Std quality Bricks	Per 1000		
02	Concreting atop pipes at low depth spots (where the depths are deviated less than 50% of standard depth) including supply of material/ labour cost cement, sand, chip etc, as per the directions of field Officers	Per Cubic mtr		

FINANCIAL BID-PART II (For 5 Pair Cable)

FROM

TO,

GENERAL MANAGER
Telecom District BIJAPUR

Sub:- Tender for underground cable construction works for 5 Pair , other than 5 Pair cable & OFC Maintenance works and other related cable works in BIJAPUR SSA for the year 2009-10

Ref. :-No: W-50/ Cable Tender /9 /2008-09 /3 dated @ BIJAPUR the 02-12-2008.

Dear Sir,

Having examined the tender documents, terms and conditions stipulated therein, specifications of work etc. we the undersigned offer to execute the cable construction works in conformity with the said specifications and conditions of contract at the following rates.

RATES FOR 5 PAIR CABLE :

Sl. No.	Description of Items	Unit	Rate per unit in figures and words
1	Excavating trenches Of depth up to 60 cms including back filling, compacting (after laying the cable) and removing excess earth from site.	Per Meter	
	a)All kinds of soils	Per Meter	
	b) Excavating trench by Removing RCC / Shahabad Tiles inside the subs compound premises And restoration of flooring after cable laying	Per Meter	
2	a) Road Crossing "Tarmac", filling back & bringing it to normal condition.	Per Mtr	
	b) Road Crossing "RCC", filling back & bringing it to normal condition	Per Mtr	
3	Paying out and laying of 5 pair cable	Per Meter	
4	Laying additional cable in same trench	Per Meter	
5	Jointing of 5 pair cable with i) 20 pair cable ii) with 50 pair cable iii) with 100 pair cable	Per joint	
6	a)Fixing of 5 pair cable on the wall inside/ outside the sub office with clips and saddles up to LJU/DP b)Fixing of LJU on Wall	Per meter Per LJU	
7	i) Erection and termination of 5 pair cable in DP internal /External ii) Painting and sign writing of 5 pair DP	Per DP Per DP	

Place:

Yours faithfully,

Date:

Signature
Name and address
Phone NO.

FINANCIAL BID-PART III (For OFC Maintenance)

FROM

TO,

GENERAL MANAGER
Telecom District BIJAPUR

Sub:- Tender for underground cable construction works for 5 Pair , other than 5 Pair cable & OFC Maintenance works and other related cable works in BIJAPUR SSA for the year 2009-10
Ref. :- No: W-50/ Cable Tender /9 /2008-09 /3 dated @ BIJAPUR the 02-12-2008.

Dear Sir,

Having examined the tender documents, terms and conditions stipulated therein, specifications of work etc. we the undersigned offer to execute the cable construction works in conformity with the said specifications and conditions of contract at the following rates.

Rates for OFC Maintenance :

Sl No	Name of the work	Unit	Rate excluding service Tax in Rs	
			In figure	In words
JOB- I (only labour charges to be quoted)				
01	Digging, trenching, filling back in stages By ramming to bringing to normal condition On assorted surfaces for Laying OFC Cable			
	a) OFC Cable at the depth of 165 cms for all types of soils	Per Mtr		
	b) Road Crossing "Tarmac", filling back & bringing it to normal condition.	Per Mtr		
	c) Road Crossing "RCC", filling back & bringing it to normal condition	Per Mtr		
	d) Road Crossing through horizontal boring method & inserting GI pipes			
	i) Upto 100mm dia	Per Mtr		
	ii) 100mm to 150mm dia	Per Mtr		
	iii) 150mm to 300mm dia	Per Mtr		

SL NO	DESCRIPTION OF ITEM	Unit	Rate excluding service Tax in Rs	
			In figure	In words
J-2	1)Laying of PLB pipes from coil coupled with PLB sockets	Per meter		
	2)Road/Rail crossing through Horizontal boring method and inserting GI pipes and pushing PLB coils inside : Up to 60 mm dia a)61 to 150 mm b)151 to 250 mm c) 286 to 1050 mm	Per meter		
	4)Laying and fixing of GI pipes and GI troughs upto 80 ckms on outside the bridges and culverts with PLB pipes inside and drawing PP rope	Per meter		
	5)Laying Full Found RCC pipe in Trenches with PLB Coil	Per		

	inside and drawing , PP rope	meter		
	6)Opening manholes, replacing of 6 mm PP rope by 8 mm PP rope, pulling of OF cable sealing of HDPE pipe by rubber bushes in manholes, providing HDPE/RCC split pipes in manhole and backfilling of manhole	Per meter		
	7)Digging of pit for jointing chamber, supping and fixing of RCC chamber with clean sand, placing of pre-cast RCC slabs on RCC chamber and back filling of jointing pit.	Per meter		
	8)Digging of pit 1 Mtr long towards jungle side on each manhole/joint chamber, supping, fixing and concerting of Route/Joint indicator painting and sign writing Route/joint indicator	Per meter		
	9)Laying RCC protection troughs/ Half round pipes / Cadapah slabs over PLB pipes in trenches in the position upto a depth of 1.65 meter	Per meter		
	10)Providing and laying , CC 1:2:4 (1 cement, 2 Sand, and 4 stone) for encasing GI pipes in road, bridges crossing and culverts	Per meter		
SL NO	DESCRIPTION OF ITEM	Unit	Rate excluding service Tax in Rs	
			In figure	In words
J-3	1. GI pipes in length of approximately 6 meter			
	2. GI pipes in length of approximately 5 meter			
	3. RCC pipes in lengths of 2 M with collars, Materials required for sealing the			
	4. RCC troughs (Half Round pipes/Slabs) in lengths of up to 1 Meter.			
	5. Couplings/ends will be arranged by the contractor.			
	6. Clamps and nails for fixing GI pipes in the bridges and culverts. 6 mm PP rope.			

BSNL WILL SUPPLY

1. PLB pipes of length 200 mtrs to 1000 mtrs along with sockets.

I will abide by the terms and conditions of this tender.

Place:

Date:

Yours faithfully,

Signature
Name and address
Phone NO.

Date:

Place:

Signature of the Tenderer
Name
&
Address

SECTION-V
ANNEXURE-I
AGREEMENT

The successful Tenderer shall have to execute the following Agreement

The agreement made on the _____ day of (month) _____(Year)
_____ between M/s _____

herein after called "The Contractor" (Which expression shall unless excluded by or repugnant to the context include its successors, her executors, administrative representative and assignee) of the one part and the Bharat Sanchar Nigam Limited here in after referred to as the BSNL Bijapur of other part.

Where as the contractor has offered to enter into contract with the Said BSNL for the execution of work of trenching and laying under ground telephone cable, cable jointing, pillar construction, DP fitting and other associated works in Bijapur Telecom District on the terms and conditions herein contained and the rates approved by the BSNL (Copy of rates annexed) have been duly accepted and where as the necessary security deposits have been furnished in accordance with the provisions of the tender document and whereas no interest will be claimed on the security deposits.

Now these presents witness and it is hereby agreed and declared by and between the parties to these presents as follows.

- 1) The contractor shall, during the period of this contract that is to say from _____ to _____ or completion of work for Rs. _____(In words)

_____ whichever is earlier or until the contract shall be determined by such notice as is hereinafter mentioned, safely carryout, by means of labours, employed at his own expenses and by means of tools, implements and equipment etc. to be supplied by him to this labour at his own expenses, all trenching, cable laying, cable jointing, pillar construction, DP fitting and other associated works as described in tender documents(annexed to the agreement), when the BSNL or @ District or any other person authorised by the General Manager Telecom in that behalf require. It is understood by the contractor that the quantity of work mentioned on the schedule is likely to change as per actual requirements as demanded by exigencies of service.

- 2) The NIT(Notice Inviting Tender) bid documents (Qualifying and financial), letter of intent, approved rates, annexed hereto and such other additional particulars, instructions, drawings, work orders as may be found requisite to be given during execution of the work shall be deemed and taken to be an integral part of the contract and shall also be deemed to be included in the expression "The Agreement" or 'The Contract" wherever herein used.
- 3) The contractor shall also supply the requisite number of workmen with means & materials as well as tolls, appliances, machines, vehicles for
- 4) Transportation, cartage etc. required for the proper execution of work within the time prescribed in the work orders.

- 5) The contractor hereby declares that nobody connected with or in the employment of the BSNL/ DOT/DTS is not/shall not ever be admitted as partner to the contract.
- 6) The contractor shall be abide by the terms and conditions, rules, guidelines, construction practices, safety precautions etc. stipulated in the tender document including any correspondence between the contractor and the BSNL having bearing on execution of work and payments of work to be done under the contract.

In witness whereof the parties presents have here into set their respective hands and seals the day and year in _____

Above written :

Signed sealed & Delivered by
the above named contractor in
the presence of
Witness :

1.

2.

Signed & Delivered on behalf
of the BSNL by the

Witness :

1.

2.

SECTION- VI
UNDERGROUND CABLE
CONSTRUCTION PRACTICES MANUAL

The guidelines in the form of Engineering Instructions on Construction Practices of Underground cables are issued by T & D wing of the BSNL, from time to time. However, the present practices are summarized here under, from the point of view of describing scope of work under various items of work.

1.0 General : The underground cables are extensively used in outdoor network of an exchange system. The cables are laid from Telephone Exchange up-to distribution points (DPs). For the purpose of flexibility, pillars are introduced in the network. The primary cables, which are of higher size, are laid from Telephone Exchange to pillars. The distribution cables are laid from pillar to D.P. The capacity of pillars and D.Ps are decided in accordance with the demand and size of the network. The planning of U.G. cable network is guided by the planning guidelines of the BSNL for external plant issued from time to time. The major portion of investment in telecom network goes into construction of UG cable network. Further, the quality of construction of UG cable network decides the quality and reliability of Telecom Services delivered to the customers to a large extent. Therefore, the construction practices of UG cables should be of very high quality, sturdy in accordance with construction specifications.

1.1 The works involved : The UG cables are buried to a depth such that the top of the cable is one meter (100 Cms) below the normal ground level. The items of work involved in UG cable laying are as under -

- i) Excavation of trench up-to a depth such that the top of the cable is one meter below the normal ground level according to the construction specifications.
- ii) Laying & pulling of cables in trenches or through pipes/ducts.
- iii) Placing of half round RCC pipes/stone slabs/Pre cast RCC slabs/Layer of bricks as per specifications.
- iv) Back filling, and compacting of the excavated trenches according to construction specifications and removal of excess earth from the site.
- v) Construction of pillar foundations, erection, painting and sign writing of pillars.
- vi) Erection, termination, painting and sign writing of D.Ps.
- vii) Termination of cables in MDF and pillars.
- viii) Jointing and end-to-end testing of cables – correspondence and electrical tests.
- ix) Supply, fixing, painting and sign writing of route and joint indicators.
- x) Documentation.

2.0 Construction Specifications :

2.1 Classification of soil strata : for the purpose of trenching, the soil strata shall be categorized as under -

2.1.1 NON SURFACED STRATA -

- I) Non Rocky – This will include all types of soils – soft soil/hard soil/morrum i.e. any strata, such as sand, gravel, loam, clay, mud, black morrum, shingle, river or nallah bed boulders, soiling of roads, paths, densely pebbles/stones etc. lime concrete, mud concrete and their mixtures which for excavation yields to the application of picks, showels, sacrifiere, ripper and other manual digging implements including chiseling.

Resorting to light blasting/electro-mechanical breakers for loosening the materials does not in any way entitle the strata to be classified as rocky.

- II) Rocky strata means generally any rock or boulder, for excavation of which hard tools can not be used and blasting/electro mechanical breakers is required, such as quartzite, granite, basalt, reinforced cement concrete (reinforced to be cut through but not separated from the concrete) and the like.

2.1.2 SURFACED STRATA : The surfaced strata shall cover the following irrespective of strata encountered below the surface.

2.1.2.1 Footpaths

- i) Tarmac (Asphalt) Foot Path : means foot path with tarmac surface with or without compacted strata below the tarmac surface, irrespective of thickness of Tarmac/Metal.
- ii) Kharanja : means Footpath covered with bricks with or without compacted strata below the surface, irrespective of thickness of bricks.
- iii) Tiled foot paths : means Footpath covered with various types of tiles/stone slabs with or without compacted strata below the tiled surface, irrespective of thickness of tiles/stone slabs.
- iv) Cement Concrete Foot Path : means the surface on footpath covered with CC(Cement concrete) with or without compacted strata below the surface, irrespective of thickness or cement concrete.

2.1.2.2 Along Road Side : Trenching along road on carpeted surface may be necessary, in certain stretches where roads have been installed edge to edge and there is no un-metalled corridor or footpath available for trenching and laying the cables.

- I) Tarmac (Asphalt) Road : means roadside with tarmac/asphalt surface with or without compacted strata below the tarmac surface, irrespective of thickness of tarmac/metal.
- II) Kharanja Road : means road covered with various types of bricks with or without compacted strata below the tiled road surface, irrespective of thickness of bricks.
- III) Tiled Roads : means road covered with various types of tiles/bricks/store slabs with or without compacted strata below the tiled road surface, irrespective of thickness of tiles/bricks/stone slabs.
- IV) Cement Concrete Road : means CC (Cement concrete) road with compacted strata below the surface on road, irrespective of thickness of cement concrete.

2.1.2.3. Road Crossings :

- I) Tarmac or Asphalt Road means the road surface, which is metalled by asphalt/tarmac, normally having compacted strata below the surface, irrespective of thickness of asphalt/tarmac.
- II) Kharanja Road means road covered with various types of bricks with or without compacted strata below the tiled road surface, irrespective of thickness of bricks.
- III) Tiled/CC Road means road of tiles of any type/stone slabs/bricks or CC road normally having compacted strata below the tiled/CC surface, irrespective of thickness of tiles/CC.

- IV) RCC Road means the surface made of cement concrete duly reinforced with steel bars normally having compacted strata below RCC, irrespective of thickness of RCC.

At road crossings, the trenches shall be so dug that top of RCC pipe shall be at one meter depth from ground level.

2.2. Excavation of Trenches :

Before excavation of trenches the route should be marked for trenching. Care should be taken to see that the route of the trench to excavate is reasonably straight, avoiding the existing underground services. The contractor should take trial pits to locate the underground services before commencement of actual trenching. These trial pits shall be 30 cms. wide, 120 cms. deep and 120 cms. long at right angles to the proposed trench at an interval of 20 to 50 Mtrs. Along the proposed cable route. If a slab is encountered, the same may be removed and trial pits may be made. In city areas, the trench will normally follow the footpath of the road except where it may have to come to the edge of carriage way or cutting across roads with the specific permission from the concerned authorities maintaining the road (such permission shall be obtained by the BSNL). Outside the city limits, the trench will normally follow the boundary of the roadside land. However, where the roadside land is full of burrow pits or afforestation or when the cable have to cross-culverts/bridges or streams, the trench may come closer to the road edge or in some cases, over the embankment or shoulder of the road (Permission for such deviations for cutting the embankment as well as shoulder of the road shall be obtained by the BSNL). The alignment of the trench will be decided by a responsible BSNL Official, not below the rank of a Junior Telecom Officer. Once the alignment is marked, no deviation from the alignment is permissible except with the approval of Engineer In-charge. While making the alignment only the center line will be marked and the contractor shall set out all other works to ensure that, the excavated trench is as straight as possible. The contractor shall provide all necessary assistance and labour, at his own cost for marking the alignment. Contractor shall remove all bushes, undergrowth, stumps, rocks and other obstacles to facilitate marking the center line without any extra charges. It is to be ensured that minimum amount of bushes and shrubs shall be removed to clear the way and the contractor shall give all considerations to the preservation of the trees.

2.3 Methods of Excavation

In city limits as well as in built up areas, the contractor shall resort to use of manual labour only to ensure that no damage is caused to any underground or surface installations belonging to other public utility services and / or private parties.

However, along the Highways and cross country routes, there shall be no objection to the contractor resorting to mechanical means of excavation, provided that no underground installations exist in the path of excavation, if any, are damaged.

There shall be no objection to resort to horizontal boring to bore a tube of required size and to push through G.I. pipe through horizontal bore at road crossing or rail crossing or small hillocks etc.

In rocky strata, excavation shall be carried out by use of electro mechanical means like breakers, or by blasting wherever permissible with express permission from the competent authority.

Necessary barricades, night lamps, warning boards, and required watchman shall be provided by the contractor to prevent any accident to pedestrian or vehicles. While carrying out blasting operations, the contractor shall ensure adequate safety by cautioning the vehicular and other

traffic. The contractor shall employ sufficient manpower for this with caution boards, flags, sign writings etc.

When trenches are excavated in slopes, uneven ground, inclined portion, the lower edge shall be treated as normal level of the ground for the purpose of measurement of depth of the trench.

In certain locations, such as uneven ground, hilly areas and all other places, due to any reason whatsoever it can be ordered to excavate beyond standard depth of 100 cms. above the cable to keep the bed of the trench as smooth as possible.

If excavation is not possible of minimum depth of 100 cms. above the cable, as detailed above, full facts shall be brought to the notice of the Engineer In-charge in writing giving details of location and reason for not being able to excavate the particular portion. Approval shall be granted by the competent authority in writing under genuine circumstances.

The contractor shall be responsible for all necessary arrangements to remove or pump out water from trench. The contractor should survey the soil conditions encountered in the section and make his own arrangement about dewatering arrangements that may be necessary. Wherever the soil is hard due to dry weather conditions, if watering is to be done for wetting the soil to make it loose, the same shall be done by the contractor.

For excavation in hard rock, where blasting operations are considered necessary, the contractor shall obtain the approval of the Engineer In-charge in writing for resorting to blasting operation. The contractor shall obtain licence from the competent authority for undertaking blasting work as well as for obtaining and storing the explosive as per the Explosive Act 1884 as amended up to date and explosive Rules 1983. The contractor shall purchase the explosives, fuses, detonations etc. only from the aforesaid Explosive Act and Explosive Rules. The contractor shall be responsible for safe custody and proper accounting of the explosive materials. Fuses and detonators shall be stored separately and away from the explosives. The Engineer In-charge or his authorised representative shall have the right to check the contractor's store and account of explosives. The contractor shall provide necessary facilities for this.

The contractor shall be responsible for any damage arising out of accident to workmen, public or property due to storage, transportation and use of explosive during blasting operation.

Blasting operations shall be carried out under the supervision of a responsible authorised agent of the contractor (referred subsequently as agent only) , during specified hours as approved in writing by the Engineer In-charge. The agent shall be conversant with the rules of blasting.

All procedures and safety precautions for the use of explosives drilling and loading of explosives before and after shot firing and disposal of explosives shall be taken by the contractor as detailed in 15:4081 safety code for blasting and related drilling operations.

2.3.1 Trenching near Culverts/Bridges

At bridges and culverts, the cable shall be laid in GI pipe of suitable size with the permission of concerned authorities maintaining the roads/bridges. While carrying out the work on

bridges and culverts, adequate arrangements for cautioning the traffic by way of caution boards during day time and danger lights at night shall be provided.

Of late the bridge construction authorities are providing ducts below the footpaths. On the bridges for various services. The Telecom officer need to maintain good liaison with the concerned authority to get one side of the duct allotted for Telecom cables. In such ducts GI pipes can be coupled and laid for pulling the cables. It would be pertinent to mention here that close liaison with bridge construction authorities would be of immense advantage in ensuring provision of ducts on one or both sides of the bridges as per future requirements. However, for laying cables on existing bridges, where duct arrangements does not exist, one of the following methods may be adopted.

- i) Where the cushion on top of the arch of the culvert is 45 cms. or more, the pipe to carry the cable may be buried on the top of the arch adjoining the parapet wall by digging close to the wheel guard. Every precaution shall be taken to see that no damage occurs to the arch of the culvert. After burying the GI pipe, the excavated surface on the arch shall be restored.
- ii) When the thickness of the cushion is less than 45 cms. the pipe to carry the cable may be buried under the wheel guard masonry. After burring the pipes, wheel guard should be re-built.
- iii) If neither of the two methods mentioned above is possible, the pipe should be clamped to the outside of the parapet wall of the culvert or bridge with the help of clamps, nails, nuts, bolts, and screws of suitable size to ensure that the pipe is securely fixed. The GI clamps should be of minimum 25 mm width and 3 mm thickness and should be fixed at an interval of 50 cms. If necessary, the pipe should be taken to the parapet walls at the ends where the wall diverges away from the roads. The work should be carried out in consultation with the authorities concerned maintaining the roads and bridges.

After laying the GI pipes, the wheel guards or arch may require repairing by concreting at site . For carrying out protection by concreting at site, the nominal dimension of concreting shall be according to the requirements of the site, Cement concrete mixture used shall be of 1:2:4 composition i.e. 1: 53 grade cement of a reputed company, 2: Coarse sand, 4: Graded coarse stone aggregate of 6mm nominal size, reinforced with MS weld mesh. As the RCC is cast at site, it is imperative to ensure that special care is taken to see that proper curing arrangements are made with adequate supply of water. The contractor shall invariably use mechanical mixer at site for providing RCC protection, to ensure consistency of the mix.

In case of small bridges and culverts, where there is a likelihood of their subsequent expansion and remodelling, the cable should be laid with some curve on both sides of the culvert or the bridge to make some extra length available for readjustment of the cable at the time of reconstruction of culvert or the bridge.

2.3.2 Excavation in surfaced strata :

2.3.2.1 Excavation on Footpath : The excavation of trenches in all types of footpaths including dismantling of asphalt/all type of tiles/CC and WBM shall be done up to a depth such that the top of the cable is 1.0 M below the normal ground level. The excavation in the footpaths will be done manually. The contractor shall have to provide shoring wherever necessary, in case the depth of trench is more than one meter. It is expected that the other services may be present below the footpath, therefore, extra care need to be exercised while excavation of trenches.

2.3.2.2 Excavation of trenches along the roads (Which are carpeted end to end)

The excavation of trenches along the roads which are carpeted from end to end including dismantling of asphalt, concrete and WBM shall be done up to a depth such that the top of the cable is 1.0 M below the normal ground level. The excavation along the roads shall be done manually. The contractor shall have to provide shoring wherever necessary, in case the depth of trench is more than one meter. It is expected that the other services may be present below the roads, therefore, extra need to be exercised while excavation of trenches.

2.3.3.3 Excavation of Road crossings/Railway crossings

The excavation of trenches in all types of roads including dismantling of asphalt/all type of tiles/CC and WBM shall be done up to a depth such that the top of the RCC pipe is one meter below the normal ground level. After excavation of trench, RCC pipes of 100mm/150mm/225mm/300mm dia shall be laid at the road crossings. On minor roads which can be temporarily closed to traffic, it is possible to open up across the entire width of the road, the pipes should be installed quickly in the trench which should then be filled in, there by reducing the time to a minimum for which the road is required to be closed. The roads, which are broad, may be opened for half their width, allowing the other half for use of vehicular traffic. The second half of the width should be opened after laying pipes and reinstating the first half of the trench. Pipes laid in the second half should be coupled firmly with those laid in the first half. Care must be taken to couple the pipes fully. The pipes should be laid with a slight slope from the center to the sides of the road to prevent collection of water. 8 mm PP rope shall be drawn through the laid pipes. To facilitate cleaning and cable pulling at a later date before closing the trench.

As the work on road crossings entails lot of inconvenience to vehicular traffic and pedestrians, it is desirable to bury extra pipes for future expansion at the initial stage itself. The spare pipes must be sealed properly at both the ends of the road to obviate the possibility of pipe getting choked due to settlement of sedimentation etc. The contractor shall have to provide shoring wherever necessary, in case the depth of trench is more than one meter. Necessary barricades, night lamps, warning boards and required watchman shall be provided by the contractor to prevent any accident to pedestrians or vehicles.

The excavation within the railway property should be taken up after getting express permission from railway authorities. When a cable has to cross a railway track, it should be laid in Iron pipes at a minimum depth of 1.25 meters below rail level. The iron pipes of the requisite type shall be supplied by the BSNL or Railway authorities as mentioned in the permission letter. If the pipes are supplied by the railways, cost shall be borne by the BSNL. The pipe line should extend on both sides of the Railway track for a sufficient distance to enable repairs to the cable, wherever necessary without disturbing the formation under the railway track. The 8 mm PP rope shall be drawn through the laid pipes to facilitate cleaning and cable pulling at a later date. It is desirable to bury extra pipes for future expansion at the initial stage itself. The spare pipes must be sealed properly at both the ends to obviate the possibility of pipe getting choked due to settlement of sedimentation etc.

2.4 CLASSIFICATION OF TRENCHES – The trenches have been categorized based on its size required for laying different sizes and number of cables as under

Sl. No	Type of trench	Trench size in Cms.			Required for
		Width		Depth above cable/pipe	
		To p	Bottom		
I	A	45	30	100	a. Single cable of any size or b. Laying any number of cables below 400 pairs * or c. Laying two cables of 400 pairs and above with/without any number of additional small size cables *
II	B	60	45	100	Laying three cables of 400 pairs and above with/without any number of additional small size cables *
III	C	75	60	100	Laying four cables of 400 pairs and above with/without any number of additional small size cables *
IV	D	90	75	100	Laying five cables of 400 pairs and above with/without any number of additional small size cables.

- ❖ The bottom width is mandatory.
- ❖ * In case of large number of cables to be laid in a trench, the type of trench can be upgraded to higher type of trench by the DGM In-charge considering site conditions.
- ❖ Where more than one cable is being laid in a trench there should be a gap of 5 cms. in between the cables. No cable should be laid one-over the other.

2.5 Trenches of less depth : Relaxation and Competent Authorities to Grant Relaxation : The depth of trench is very important for future life of cables. Therefore, the contractor is obligated to ensure that the standard depth is maintained in a normal circumstances. However, due to obstructions, if the standard depth cannot be achieved, lower depth up to certain limits are acceptable by the authorities as prescribed below with extra protection as per specifications. The relaxation by the competent authority prescribed below shall be obtained giving reasons for not achieving standard depth.

Size of Cables	Standard depth in Cms.	Minimum acceptable depth without relaxation	Powers delegated for relaxation for depth up to the depth in Cms.	
			DET	DGM
All sizes	100	90	80	30

3.0 Laying & Pulling of Cables

The normal methods used in the BSNL for laying Underground cables are

- i) Laying direct in the ground
- ii) Pulling through Ducts

3.1 Laying direct in the ground : After excavation of trenches, approximately 5 Cms. thick bed of soft soil/or sand (in case the excavated material contains sharp pieces of rock/stones) is laid before directly laying the cable. Adequate care shall be exercised while laying the cables so that the cables are not put to undue tension/pressure as this may adversely affect the electrical characteristics of cables with passage of time.

The cables shall invariably be laid in the trenches through jack and spindle at appropriate position for easy unwinding, putting cable rollers in the trenches, if required at a regular interval of approx. 20 Mtrs. Under proper supervision.

Adequate overlaps shall be left for jointing 2 successive lengths of cables as under –

Size of cable	Length of Overlap
1200 pairs and above	1.5 meter
800 and 1000 pairs	1.4 meter
400 and 600 pairs	1.2 meter
Below 400 pairs	1.0 meter

In case the previous length ends in the middle, of a carriage way / footpath / road crossing/bridge/culvert, it should be negotiated out of the carriage way/foot path/road crossing/bridge/culvert by laying the next length early and removing the excess overlap cable and depositing to the stores under proper receipt.

Where more than one cable are laid in the same trench, the jointing locations shall be suitably staggered. When a cable is to be terminated in a pillar, the depth of cable for such termination shall be equal to (Jointing length + height of the pillar).

Sharp bends shall be avoided. Bends, if any, the radius of curvature should be more than at least six times the diameter of the cable. After the completion of laying sand/sieved earth, free of stones etc. shall be placed over the cable to a height of 7.5 cms. duly leveled and rammed lightly to form a bedding for warming bricks or half round RCC pipes/store slab/pre cast RCC slab for mechanical protection.

The cables may be required to be pulled through RCC/GI pipes at road crossings, railway crossings, bridges and culverts. Extra care should be taken to avoid damage to the cable while pulling through pipes which may occur due to kinks. The contractor should have the required tools and equipment for the purpose to complete the job in a professional manner.

When trenches are excavated up to specified depth, properly dressed and leveled and the cable(s) is/are laid, joint measurement of depth above cable shall be taken by representatives of contractor and Engineer In-charge. Measurements shall be recorded in measurement book with their signature. Trenches for which measurements are recorded in measurement book shall be considered as approved trenches.

The contractor shall ensure that trenching and cable laying activities are continuous, without leaving patches or portions incomplete in between.

When there are number of cables of the same size in the same trench it becomes difficult to identify the particular cable at time of maintenance. Therefore, identification collars bearing L.I. Number of the cable shall be tagged to all the cables. The identification collars shall be provided at an interval of not more than 2 meters.

3.2 Cable Pulling through Ducts :

Before starting cable pulling work, the duct and manholes/hand holes must be cleaned and made free from obstructions so that cable is not damaged while hauling. The contractor shall be adequately equipped with tools and the equipment like continuous steel rod, winch

machine, cable hauling rope fittings, swivels, hauling eyes, cable grips etc. to carry out the cable pulling work through ducts in a professional manner. As the cable pulling through ducts is a specialized work and any damage to cable in duct may lead to development of faults progressively with the passage of time, it is imperative that the work force and the supervisors responsible to carry out this work are fully trained and have sufficient experience.

4.0 Placing of Half round RCC pipes/Stone slabs/Pre cast RCC slabs/Layer of Bricks.

After laying of cables, it is covered by a consolidated layer of 8 cms. of soft earth (or sand in special cases where excavated material contains sharp stone/objects) which should be free from stones or other sharp objects, carefully pressed and lightly tamped. On this layer of soft earth a layer of half round RCC pipes(100/150 mm dia)/Stone slabs/Pre cast RCC slabs/Bricks is placed as a warning layer and also as a mechanical protection, as the telecom cables are vulnerable to damages due to excavations by other agencies.

The warning/protection layer of half round RCC pipes/Stone slabs/Pre cast RCC slabs/Bricks is laid as per following schedule depending upon the size of the cables and depth of trench.

Sl. No.	Size of cables	Depth (In cms)	Warning Layer/Protection
1	200 Pairs and below	All depths	Bricks/Stone slabs
2	400 Pairs and above	Upto 80 cms.	Bricks/Stone slabs
3	400 Pairs and above	Below 80 cms.	Half round RCC pipes/Stone slabs/Pre cast RCC slabs/Bricks

The choice for protection layer out of half round RCC pipes, stone slabs, and Pre cast RCC slabs or bricks may be decided based on availability and comparative cost. Regarding half round RCC pipes, up to 400 pairs cable 100mm dia RCC pipe and above 400 pairs cables 150mm dia RCC pipes shall be required.

4.1 Layer of Bricks :

Well burnt non-modular bricks of nominal size 229 mm(+/- 4mm) X 114 mm(+/- 3mm) X 70 mm of minimum compressive strength of 75 Kgf per square cm shall be used as a warning/protection layer. Bricks shall be used longitudinally over the cables up to 400 pairs and transversely over cables above 400 pairs or two cables of size up to 400 pairs. Approximately 4400 bricks per kilometer shall be required for laying longitudinally and 9000 bricks per KM shall be required for laying transversely.

SDE In-charge of work shall get the bricks tested from a reputed laboratory for compressive strength. One test sample shall be got tested for a lot of 50,000 bricks or part thereof. The test certificate shall be attached along with the final bill.

5.0 Back filling and Compacting of the Excavated trenches :

After laying the cables and providing warning/protection layer as per specifications, the remaining portion of the trench shall be filled in and well tamped in steps. The trench should be back filled in layers not exceeding 20 cms. each at a time and rammed. The contractor shall remove the excess earth from the site and leave only a crown of earth rising approximately 5 cms. in the centre. This allows for natural subsidence. When digging on footpaths along road crossings, care should be taken to see that the road is made motor-able as soon as the work is completed. The permanent reinstatement of roads and pavement shall be done by the local authorities.

6.0 Erection of Pillars :

The pillars should be installed in safe places on footpaths at suitable locations convenient and accessible for maintenance. The positions close to the edge of footpaths, near transformers or below Electric Lines particularly H.T. lines must be avoided. The location of pillar, which may obstruct the view of drivers of vehicles as on kerb lines at street intersections, locations in which the doors of the pillars when opened constitute a danger to pedestrians or traffic must be avoided. In general the pillar shall be so located that reasonable and safe working conditions to the staff are possible throughout the year. The height of the pillar shall be such that the pillar does not get submerged during rains.

6.1 Construction of RCC plinth for pillars and Erection of pillars :

The plinth for erection of pillars shall be made of RCC, cast at site. The dimensions of the pits for casting the foundation of the plinth shall be as under –

Length = $W+30$ cms.

Width = $D+30$ cms.

Depth = 110 cms.

When W = Width of pillar shell, D = Depth of the pillar shell

After digging the pit for casting the plinth of the pillar, a G. I. plate of size 300mm X 300 mm and 4mm thickness bolted to copper wire of 7/18 size (2 meter length) with the help of lug shall be buried in the bottom of the trench to form earth for the pillar. The copper wire shall be embedded in RCC work with one end coming out on top of the plinth to be terminated in the C.T. box mounting frame inside the pillar shell.

The earth in the bottom of the plinth shall be well rammed. The concrete case for the pillar should be dimensioned to suit the particular pillar shell dimensions. The RCC for the pillar foundation should be in the ratio of 1:2:4 (1 cement of 53 grade of reputed brand, 2 coarse sand, 3 graded stone aggregate of 20mm nominal size). The details of reinforcement and dimensions of plinth work are shown in figures 1 & 2 . The height of the pillar plinth shall be such that the bottom of pillar shell should normally remain 45 cms. above the normal ground level. However, in localities, which are subjected to flooding during the rainy season, the height of the base shall be suitably raised so that the bottom of the pillar is kept well above the high flood level. The plinth shall be cast as per the approved drawings and with the use of proper form work. After the RCC work is settled and cured , the plinth shall be finished with cement mortar in proportion of 1:3(1 cement of 53 grade of reputed brand , 3 fine sand) of 6mm thickness. The contractor shall arrange water for curing the plinth for at least 7 days to give necessary strength. The sides of the RCC formwork shall be filled with the excavated earth and rammed properly to give it necessary strength so that the plinth does not tilt and loose its vertically at a later date. Finally the plinth above the ground level shall be painted with black oil paint.

Erection of pillar shall be done by fixing the pillar boxes on the plinth with 10mm bolts embedded in RCC formwork firmly and terminating the earth wire on the C.T. Box mounting frame inside.

6.2 Painting and sign writing of pillars :

The pillar should be cleaned thoroughly and one coat of red oxide primer shall be applied on all surfaces i.e. inside and out side surfaces. After it is dried up, spray painting shall be done with battleship grey paint of reputed brand on all surfaces. Once the grey paint dries up, the sign writing shall be done after cleaning the surface with dry cloth, with white enamel paint of reputed brand. Sign writing shall be carried out in capital letters of height 10 cms. and width 7.5 cms. (4"X3") and as per instructions of Engineer-in-charge. The following contents shall be sign written on the face of the pillar shell.

- Logo of the BSNL
- Name of Telecom District
- Number of the pillar which will carry abbreviated 3-4 digit alphabetical code of the exchange system followed by the number of the pillar.

7.0 Erection of D.Ps.

The distribution points (D.Ps) are fitted on poles, walls or in the staircase walls easily accessible for maintenance, to terminate distribution cables coming from pillars. There are two types of D.Ps which are required to be erected.

External D.Ps

Internal D.Ps

The items of work involved in erection of a D.P. are as under

7.1 External D.Ps

- i) Fitting of post with all components i.e. Hamilton tubes (normally A4BC or BC), socket, cap and spikes.
- ii) Digging pit for the post
- iii) Fitting sole plate in the assembled tube and lowering assembled post in the pit
- iv) Re-instating and consolidating after making the post upright and rigid
- v) Preparation and installation of stay(s)
- vi) Pulling the L.I. cable (5 pair/10 pair/20 pair) through 20/32 mm dia G.I. pipe and terminating the cable pairs in D.P. box and fixing of D.P. box on the post with the help of fixtures (either steel tapes & accessories such as buckles, pole rings, pole brackets, Retainer clamps & Hooks, Drive bolts, wall rings, plastic plugs etc. or set of three G.I. clamps, saddles, brackets etc)
- vii) Painting & sign writing of D.P. post. The D.P. post shall be painted with enamel paint of reputed brand in three coloured bands of ten inch each (Red, Blue, and Red). The painting of lower red band will start at five feet from ground. The sign writing will be done in the middle of the blue band with white enamel paint of reputed brand. The contents of the sign writing are given below –
 - Abbreviated code of name of SSA
 - Abbreviated code of exchange system
 - Numbering of the D.P.

The height of the letters and contents according to numbering scheme of DPs in the SSA will be given by the Engineer-in-charge.

Internal D.Ps : The items of work in erection of internal D.Ps are as under –

- i) Fixing of 5 pair cable with the help of suitable clamps, nails and saddles at every 30 cms.
- ii) Painting & sign writing of D.P. t. The sign writing shall be done on the wall near the D.P. box. The sign writing shall be done on blue background of 30mmX 200mm with

sign writing in white colour. Enamel paint of reputed brand shall be used for painting and sign writing. The contents of the sign writing are given below –

- Abbreviated code of name of SSA
- Abbreviated code of exchange system
- Numbering of the D.P.

The height of the letters and contents according to numbering scheme of DPs in the SSA will be given by the Engineer-in-charge.

8.0 Termination of cables in MDF and Pillars –

The U.G. cables are terminated on tag blocks on line side of the MDF. The MDF consists of iron framework and the side tag blocks are fitted on verticals. In the BSNL, depending upon the height of the MDF room, MDFs of different sizes are erected. For simplicity and uniformity, a standard numbering scheme of verticals, tag blocks and tag numbers in the tag block is followed. From the non-growing end, the verticals are numbered as 01, 02, and so on. The tag blocks in vertical are numbered as 01,02 and so on from top to bottom. In the tag block, which is of 100 pairs, tags are numbered as 01 to 100 from top most left corner to bottom most right corner.

The U.G. cable are terminated on MDF from top to bottom on a vertical. The cables in pillars are terminated in the tag blocks of 100 pairs each. For the sake of simplicity and uniformity, a standard numbering scheme of tag blocks in a pillar is followed. The verticals in pillar are numbered as A,B,C, and D. The tag blocks are counted from top to bottom in a column as A1, A2, ..., B1, B2, ..., C1, C2, ..., & D1, D2, The tags in a tag block of 100 pairs are counted as 01,02, ..., 100 from top most left corner to bottom most right corner. The A and C column tag blocks are used for terminating the primary cables and B and D column tag blocks are used for terminating the distribution cables.

While terminating the cables in MDFs and pillars, the correspondence of pairs shall be maintained from the point of view of counting of pairs and maintenance of the cables. In case of armoured cables, the armour of the cable shall be connected to the C.T. box mounting frame in the pillar and to the verticals of MDF, which are earthed.

For terminating the cables in pillars, the joints at the foot of the pillar should be avoided and the cable should be directly led into the pillar through inlet of the pillar shell. The sheath of the cable should be removed inside the pillar and the bunches of the pairs shall be terminated on tag blocks after cleaning and lacing neatly. The termination of cables of MDF and pillars (and of course in D.P. also) should be done using only the standard tools.

The work of “termination on MDF and Pillars” includes –

1. Fixing of tag blocks on MDF vertical (CT boxes in pillars)
2. Drawing the cable into the pillar and removing the cable sheath for required length.
3. Providing earth continuity with the armour of the cable(s).
4. Cleaning the insulated conductors and covering the formed bunches with PVC sleeve/tape.
5. Termination of cable pairs in Tag blocks/CT boxes.
6. Sign writing with white enamel paint of reputed brand on inner panel of the pillar shall be done indicating the termination details. On MDF, the written labels shall be put in place provided for it indicating the termination details. The details of sign writing shall be given by the Engineer-n-charge.

The termination of cables should be done using standard tools.

9.0 Jointing of cables and End to End Testing :

"A chain is as strong as its weakest link", hence, the quality of external plant is depends upon quality of jointing work to a huge extent,. As mentioned elsewhere, the external plant using UG copper cables entails huge investment to the tune of Rs. 10,000/- per pair on an average. If some pairs are lost in one joint, the pairs are not available for the entire length of the cable. The ;loss of pairs is not only loss of capital but also the BSNL loses the potential revenue by not able to provide the connections. In view of these facts, the quality of jointing work is of immense importance and therefore, the jointing work should be done by experienced jointers using standard tools and accessories.

The work of cable jointing involves jointing of pairs by twisting or machine jointing using modular connectors. The quality of joint is vital for overall electrical characteristics and quality of transmission of the subscriber loop and therefore, the same has to be done meticulously. There are three different type of joints –

- (i) Straight joint : for connecting all the pairs of two cables.
- (ii) Branch joint : for connecting pairs of one cable to two or more different cables branching out at the joint.
- (iii) Teeing joint : Teeing of cable is done at the time of area transfer or re-arrangements of cables in the external joint.

The items of work involved in jointing are as under –

9.1 Straight and Branch Joints :

- a. Digging the pit for the joint.
- b. Preparation of cable ends for jointing.
- c. Jointing of cable conductors by twisting or by machine jointing using module connectors.
- d. Cleaning the joint and flooding of the joint (Flooding of joint shall be mandatory)
- e. Providing protection to the joint with half round RCC pipe/stone slab/pre cast RCC slabs.
- f. Back filling and compacting.
- g. Providing joint indicators and noting, distances from three permanent points for future reference to locate the joint.

9.2 Teeing work involved in Area Transfer/Re-arrangement work –

The following works are involved in teeing for Area Transfer/Re-arrangement work

- a. Digging pit for the joint.
- b. Operating the cable and numbering out.
- c. Putting sleeves with indicator slip on cable pairs.
- d. Jointing with new cable i.e. Tee joint.
- e. Conducting correspondence test between old D.P. and New D.P. on MDFs.
- f. Closing the joint by Thermo shrinking if required before releasing the Tee.
- g. Release of Tee after area transfer.
Closing the joint by thermo shrinking after release of Tee. And flooding of the joint (Flooding of joints shall be mandatory).
- h. Providing protection to the joint with half round RCC pipe/stone slabs/Pre cast RCC slabs.
- i. Back filling and compacting.
- j. Providing joint indicators and noting distances from three permanent points for future reference to locate the joints.

From area transfer work, it is preferable to award teeing and cable construction work from new MDF to the teeing point covering laying, jointing and termination of cables on new MDF to a single contractor to facilitate smooth completion and testing.

The contractor shall make hundred percent pairs available from end-to-end. To ensure the availability of 100% pairs end-to-end it is a good practice not to close the joints until all the pairs are tested from MDF to Pillar for primary cable work and from Pillar to D.P. for distribution cable work. "An ounce of prevention is worth a pound of cure ." In case of some pairs missing, the defects should be rectified at this stage itself, as the joints are still kept open. Once all the pairs are available, joint shall be closed properly using jelly and other accessories as per instructions. Proper and adequate filling of jelly in the joints is of importance as any water ingress and trapped in the cavities will result into low insulation fault at later date.

Before closing the joint the contractor is required to place a slip inside the joint, indicating the following :

- Name of the contractor.
- Name of the official of the BSNL supervising the work.
- Date of joint

9.3 End-to-End testing – The cables are to be tested for continuity of pairs and electrical and transmission characteristics of the cable pairs, between MDF and pillar in case of primary cables and pillar and D.Ps in case of distribution cables, separately. The test parameters should conform to the A.T. standards of the BSNL issued by T&D Circle. Broadly the following parameters are tested. (i) insulation (ii) cross insulation (iii) Continuity (iv) loop resistance (v) transmission loss (vi) cross talk level.

10 Cable route and Joint indicators – Cable route and joint indicators are to be provided to indicate the cable route and location joints. The route and joint indicators are to be used for cables laid in rural areas as availability of landmarks over wide expanse of lands is scanty. The route indicators are to be placed at every 200 meters and at every place where the cable changes direction. Joint indicators are to be provided at all joints. For the sake of uniformity and from viewpoint of identification of cable at later date for maintenance, the route indicators shall be provided in the alignment of the trench and the joint indicators should be provided in the alignment of the trench 2 meters towards exchange from the location of joint to obviate removal of joint indicator at the time of opening the joint.

The route and joint indicators are of RCC of trapezoidal shape having base of approximately 250mm X 150mm and top 200mm X 75mm and height 100mm. The indicators shall be supplied by the BSNL. For fixing the route/joint indicators, the pits of size 60 cms. X 60 cms and 75 cms, depth shall be dug. The indicator shall be secured in upright position by ramming with stone and murrum upto a depth of 15 cms. and concreting the remaining portion of 15 cms. by concrete of 1:2:4 (1 cement, 2 coarse sand and store aggregate of 20mm nominal size) Necessary curing shall be carried for the concreting structure with sufficient amount of water for reasonable time to harden the structure.

The route/joint indicators shall be painted with Primer before painting with Oil paint. The route indicators shall be painted with yellow paint and joint indicators shall be painted with red paint. The construction specifications of route and joint indicators are given in the Figure 3.

11 Documentation :

The documentation, consisting of route diagrams, depicting joint indicators, termination details of cables on MDF, Pillars and D.Ps, is of immense help at the time of maintenance or undertaking any re-arrangement work in the external plant. The details available in documentation prove to be of huge value in subsequent planning and construction activities in the external plant. These documents are also useful in coordinating excavating activities by the other agencies thus saving our huge investment from getting damaged and also avoiding disruption of services.

The documentation shall be prepared primary cable wise for one or more than one primary cables with all its pillars shown and for all its pillars the distribution cables shown pillar wise, for the works ordered against a work order. The scope of work in documentation shall include the following –

- i) Route diagram – Preparation of route diagram depicting alignment of cables on roadsides on a geographical map of the pillar area/exchange area. Though it is desirable to prepare these diagrams on geographical maps to the scale but in case geographical maps are not available, the maps should be constructed to a reasonable accuracy by taking details from the local bodies of the area. On the diagram, besides showing alignment of the cable, the topographical details of the road, location of pillars and landmarks along side should also be shown to locate the cable(s) easily as and when required. These diagrams shall be prepared on A-3 sheets 80 GSM.
- ii) Joint Offsets – The joint offsets will, inter-alia-show the locations of joints by showing distances from three permanent points so that the joints can be located easily as and when required. Besides showing the locations of joints, it shall also show details of distribution of pairs in the joint in case of branch joint. These joint offsets shall be prepared in A-4 size sheets of 80 GSM.
- iii) Pillar Cards – The pillar cards shall show the termination details of primary as well as distribution cables in the pillar. These joint offsets shall be prepared in A-4 size sheets of 80 GSM.
- iv) MDF termination cards – The MDF termination cards shall provide details of termination of cable depicting full details of MDF vertical, tag block numbers and pair numbers of the cable terminated on the MDF and its correspondence with termination in pillars. These cards shall be prepared in A-4 sheets of 80 GSM.

The route diagram, joint offsets, pillar cards and MDF termination cards shall be prepared by the contractor through an experienced draughtsman or these may be computerized. The utility of the documentation will be enhanced if the existing cables are also shown on these diagrams being prepared for the new work. The contractor shall be bound to implant the details on the documents if supplied by Engineer-in-charge timely, without any extra cost. All the diagrams/cards/joint offsets shall bear the signatures of the contractor, the Engineer-in-charge and the A.T. officer as a proof of accuracy of the diagram.

All the above documents (i to iv) pertaining to a pillar area/exchange system (in case of small exchange system) shall be bound in A-4 size. The cover sheets shall be of 100 GSM and laminated. The front cover shall have the following details –

1. Name of the SSA
2. Name of the Exchange system
3. Name of the contractor
4. Name and Number of the pillar/exchange system
5. Work Order Number
6. Date of commencement of work

7. Date of completion of work

The contractor shall supply 6 copies of bound documents as one set of Documentation. The rate for one set of documentation is given in standard schedule rates.

12 SAFETY PRECAUTIONS :

12.1 Safety precautions where excavating or working in excavations close to electric cables -

The Engineer-In-charge of the work should get full information from Electricity Undertaking regarding any electric cables, which are known or suspect to exist near the proposed excavation and unless this is done, excavation should not be carried out in the section concerned. The electricity undertaking should be asked to send a representative and work should be preceded with close coordination with them.

Only wooden handled hand tools should be used until the electric cables have been completely exposed. Power cables not laid in conduits are usually protected from above by a cover slab of concrete, brick or stone. They may or may not be protected on the sides. It is safer, therefore, always to drive the point of the pickaxe downwards then uncovering a cable, so that there is less chance of missing such warning slabs. No workman should be permitted to work alone where there are electric cables involved. At least one more man should be working near by so that help can be given quickly in case of an accident. If disconnection of power could be arranged in that section it will be better. No electric cables shall be moved or altered without the consent of the Electric authority and they should be contacted to do the needful. If an electric cable is damaged even slightly, it should be reported to the Electric authority and any warning bricks disturbed during excavation should be replaced while back filling the trench. Before driving a spike into the ground, the presence of other underground properties should be checked. Information on plans regarding the location of power cables need not to be assumed as wholly accurate. Full precautions should be taken in the vicinity until the power cable is uncovered. All electric cables should be regarded as being live and consequently dangerous. Any power is generally dangerous, even low voltage proving fatal in several cases.

12.1.1 Electric Shock-Action and Treatment - Free the victim from the contact as quickly as possible. He should be jerked away from the live conductors by dry timber, dry rope or dry clothing. Care should be taken not to touch with bare hands as his body may be energized while in contact. Artificial respiration should begin immediately to restore breathing even if life appears to be extinct. Every moment of delay is serious, so, in the meanwhile, a doctor should be called for.

12.2 Safety precautions while working in public street and along railway lines – When a road or footpath is to be opened in the course of work, special care should be taken to see that proper protection is provided to prevent any accidents from occurring. Excavation work should be done in such a manner that it will not unduly cause inconvenience to pedestrians or occupants of buildings or obstruct road traffic. Suitable bridges over open trenches should be so planned that these are required for the minimum possible time. Where bridges are constructed to accommodate vehicular traffic and is done near or on railway property, it should be with the full consent and knowledge of the competent railway authorities.

12.2.1 Danger from falling material – Care should be taken to see that apparatus, tools or other excavating implements or excavated materials are not left in a dangerous or insecure position so as to fall or be knocked into the trench thereby injuring any workman who may be working inside the trench.

12.2.2 Care when working in Excavations - Jumping into a trench is dangerous. If it is deep, workmen should be encouraged to lower themselves. Workers should work at safe distance so as to

avoid striking each other accidentally with tools. If the walls of the trench contain glass bits, corroded wire or a sharp objects they should be removed carefully. If an obstruction is encountered, it should be carefully uncovered and protected if necessary. Care must be taken to see that excavated material is not left in such a position that it is likely to cause any accident or obstruction to a roadway or waterway. If possible the excavated material should be put between the workmen and the traffic without encroaching too much on the road.

12.2.3 Danger of cave in – When working in deep trenches in loose soil, timbering up/shoring the sides will prevent soil subsidence. The excavated material should be kept at sufficient distance from the edge of the trench or pit. Vehicles or heavy equipment must not be permitted to approach too close to the excavation. When making tunneled opening, it should be ensured that the soil is compact enough to prevent cave in even under adverse conditions of traffic. Extra care should be taken while excavating near the foundations of buildings or retaining walls. In such cases, excavation should be done gradually and as far as possible in the presence of the owners of the property.

12.2.4 Protection of Excavations – Excavations in populated areas, which are not likely to be filled up on the same day should be protected by barriers or other effective means of preventing accidents and the location of all such openings must in any event be indicated by red flags or other suitable warning signs. During the hours from dusk to dawn, adequate number of red warning lamps should be displayed. Supervisory officers should ensure that all excavations are adequately protected in this manner as serious risk and responsibility is involved. Notwithstanding adoption of the above mentioned precautions, work involving excavations should be so arranged as to keep the extent of opened ground and the time to open it to a minimum.

12.2.5 Precautions while working on roads – The period between half an hour after sun set and half an hour before sun-rise, and any period of fog or abnormal darkness may also be considered as night for the purpose of these instructions, for the purpose of providing the warning signs. Excavation liable to cause danger to vehicles or the public must at all times be protected with fencing of rope tied to strong uprights or bamboo poles at a suitable height or by some other effective means. Any such temporary erection which is likely to cause obstructions and which is not readily visible should be marked by posts carrying red flags or boards with a red background by day and by continuously lighted lamps at night.

The flags and lamps should be in conspicuous positions so as to indicate the pedestrians and drivers of vehicles the full expanse, i.e. both width and length of the obstructions. The distance between lamps or between flags should not generally exceed 1.25 mtrs. Along the width and 6 mtrs. Along length of the obstructions in non congested areas, but 4 mtrs. Along the length in congested areas. If the excavation is extensive, sufficient notice to give adequate warning of the danger, should be displayed conspicuously not less than 1.25 mtrs. Above the ground and close to the excavation. Where any excavation is not clearly visible for a distance of 25 mtrs. To traffic approaching from any direction or any part of the carriage way of the road in which the excavation exists, a warning notice should be placed on the kerb or edge of all such roads from which the excavation or as near the distance as is practicable but not less than 10 cms. from the junction of an entering or intersecting road in which the excavation exists. All warning lamps should exhibit a red light, but white lights may be used in addition to facilitate working at nights. Wherever required a passage for pedestrians with footbridge should be provided. At excavations, cable drums, tools and all materials likely to offer obstructions should be properly folded round and protected. This applies to jointer's tents as well, leads, hoses etc stretched and across the carriage-way should be guarded adequately for their own protection and also that of the public.

12.2.6 Traffic Control – The police authorities are normally responsible for the control of traffic and may require the setting up of traffic controls to reduce the inconvenience occasioned by establishment of a singly line of traffic due to restriction in road width or any other form of obstruction caused by the work. As far as possible, such arrangements should be settled in advance. If there are any specific regulations imposed by the local authorities, these should be followed.

12.2.7 Working along Railway Lines – Normally, all works at Railway crossing is to be done under supervision of the railway authorities concerned, but it is to be borne in mind that use of while, red or green flags by the BSNL staff is positively forbidden to be used when working along a railway line as this practice may cause accident through engine drivers mistaking them for railway signals. When working along a double line of railway, the men should be warned to keep a sharp look on both the “UP” and “DOWN” lines to avoid the possibility of any accident when trains pass or happen to cross one another ear the work spot.

12.3 Procedure & Safety measures for use of explosives during blasting for trenching – In areas where the cable trench cannot be done manually on account of boulders and rocks, it is necessary to blast the rocks by using suitable explosives. The quality of explosive to be used depends on the nature of the rocks and the kind of boulders. A few types of explosive fuses and detonators normally used for making trenches for cable works are detailed below -

- i) Gun Powder
- ii) Nitrate Mixture
- iii) Gelatin
- iv) Safety fuse
- v) Electric detonator
- vi) Ordinary detonator

12.3.1 Procedure: A detailed survey of the route is to be done to assess the length of the section where trenching is to be done with the help of blasting. A route diagram of the rocky section may be prepared indicating the length of the route where the explosives are to be used. For the purpose of obtaining licence, a longer length of route should be given in the application as in many cases, after digging, rocks appear were blasting was not initially anticipated.

Next a licence will have to be obtained for use and storing of explosive in that section. If the area falls under a Police Commissioner, the authority for granting such licence is the Police Commissioner of the concerned area. When the route does not fall in the jurisdiction of a Police Commissioner, the authority for issuing licence is the District Magistrate.

The concerned authority should be applied in prescribed form with a route map. The concerned authority will make an enquiry and issue a licence for using/storing explosives for cable trenching work. Such licence will be valid for 15 days only. The licence should be got renewed if the blasting operation need to be extended. Once the licence is granted, it is the responsibility of the holders of the licence for the proper use of explosives, its transportation and storing.

12.3.2 Method of using – The safest explosive is the gelatin and electric detonator. Gelatin is in the form of a stick. Electric detonator is a type of fuse for firing the explosive electrically. Holes are made at suitable intervals on rocky terrain or boulders either by air compressor or by manual chipping. The depth of the holes should be 2 to 3 ft. Fill up the holes with the small quantity of sand for about 6”. First the electric detonator is to be inserted into the gelatin and the gelatin is to be inserted into holes keeping the + ve and – ve wirings of electric detonators outside the holes. Again refill the holes with sand. These + ve and – ve insulated wires of detonator are then extended and finally connected to an EXPLODER kept at a distance of not less that 100 mtrs.

Now the explosive is ready for blasting. But, before connecting wires to exploder for blasting, all necessary precautions for stopping the traffic, use of red flags, exchange of caution signals etc. should be completed and only then exploder should be connected and operated.

12.3.3 Operation of exploder (IDL Schaffer type 350 type exploder) The 350 type blasting machine consists of a blasting block with blasting machine system and the explosion proof light-alloy injection moulded housing. The exploder is held with the left hand. The twist handle is applied to the drive pin, clapped with the right hand turned in the clock wise direction in continuous measurements at the highest speed from the initial position until it reached to a stop. At this stage an indication lamp will glow. When the indication lamp glows, "Press button switch" should be pressed. This will extend the electric current to detonator and gelatin will be detonated. The rod will be blasted out of the trench. Number of holes can be blasted in a single stroke by connecting all such detonators in series connection and finally to the exploder. After blasting, again mazdoors are engaged on the work to clear the debris. If the result of the first blasting is not satisfactory, it should be repeated again on the same place.

Warning –

There may be two reasons for unsatisfactory results of the blasting.

- a) Misfire of gelatin due to leakage of current from detonator.
- b) Over loading because of overburdens.

Never pull the broken wire pieces from the holes in such cases. Attempt should not be made to re-blast the misfired gelatin. The safest way is to make a fresh hole by its side and put fresh gelatin in that hole and blast it.

Precautions –

The abstract of Explosives Rules 1983 which are relevant to out work is given below –

Restriction of delivery and dispatch of explosives – No person shall deliver or despatch any explosives to any one other than a person who

a) is the holder of a licence to possess the explosives or the agent of a holder of such a licence duly authorised by him in writing on his behalf..

OR

b) is entitled under these rules to possess the explosives without a licence.

The explosives so delivered or dispatched shall in no case exceed the quantity, which the person to whom they are delivered or dispatched is authorised to possess with or without a licence under these rules.

No person shall receive explosives from any person other than the holder of a licence granted under these rules. No person shall receive from or transfer explosives to any person for a temporary storage or safe-custody in a licensed premise unless prior approval is obtained from the Chief Collector.

- Protection from Lightening during Storing –Every magazine shall have attached there to one or more efficient lightening conductors designed and erected in accordance with the specifications laid down in Indian Standard Specifications No. 2309 as amended from time to time. The connections to various parts of earth resistance of the lightening conductor terminal on the building to the earth shall be tested at least once in every year by a qualified electrical engineer or any other competent person holding a certificate of competency in this behalf from the State Electricity BSNL. A certificate showing the results of such tests and the date of the last test shall be hung up in conspicuous place in the building.

- Protection during thunder-storm – When a thunder-storm appears to be imminent in the vicinity of a magazine or store house every person engaged in or around such magazine and store house shall be withdrawn to a safe distance from such magazine or store house and the magazine

and store house shall be kept closed and locked until the thunder storm has ceased or threat of its has passed.

- Maintenance of records – Every person holding a licence granted under these rules for possession, sale or use of explosives shall maintain records in the prescribed forms and shall produce such record on demand to an Inspection Officer.
- Explosives not to be kept in damaged boxes – The licensee of every magazine or store house shall ensure that, the explosives are always kept in their original outer package. In case, the outer package gets damaged so that the explosive contained therein cannot be stored or transported such explosives shall be repacked only after the same are examined by the Controller of Explosives.
- Storage of Explosives in excess of the licensed quantity – The quantity of any kind of explosives kept in any licensed magazine or store house shall not exceed the quantity entered in the licence against such kind of explosives. No explosives in excess of the licensed quantity shall be stored in the magazine or store house unless a permit in this behalf is obtained from the licensing authority by a letter or telegram.

Precautions to be observed at Site – The electric power at the blasting site shall be discontinued as far as practicable before charging the explosives. No work other than that associated with the charging operations shall be carried out within 10 meters of the holes unless otherwise specified to the contrary by the licensing authority. When charging is completed, any surplus explosive detonators and fuses shall be removed from the vicinity of the hole and stored at a distance which should prevent accidental detonation in the event of a charge detonating prematurely in any hole. The holes which have been charged with explosives shall not be left unattended till the blasting is completed. Care shall be taken to ensure that fuse or wires connected to the detonation are not damaged during the placing of stemming materials and tamping.

- Suitable warning procedure to be maintained – The licensee or a person appointed by the licensee to be in charge of the use of explosives at the site shall lay down a clear warning procedure consisting of warning signs and suitable signals and all persons employed in the area shall be made fully conversant with such signs and signals.
- Precautions to be observed while firing – The end of the safety fuse (If used in place of a detonator should be freshly cut before being lighted. The exploders shall be regularly tested and maintained in a fit condition for use in firing. An exploder shall not be used for firing a circuit above its rated capacity. The electric circuits shall be tested for continuity before firing. All persons, other than the shot-firer and his assistant, if any, shall be withdrawn from the site before testing the continuity.

For the purpose of jointing, the ends of all wires and cables should have the insulation removed for a maximum length of 5 cms. and should, then be made clear and bright for a minimum length of 2.5 cms. and the ends to be joined should be twisted together so as to have a positive metal contact. Then these should be taped with insulation to avoid leakage when in contact with earth.

In case of blasting with dynamite or any other high explosive, the position of all the bore holes to be drilled shall be marked in circles with white paint. These shall be inspected by the Contractor's agent. Bore holes shall be of a size that the cartridge can easily pass down. After the drilling operation, the agent shall inspect the holes to ensure that drilling has been done only at the marked locations and no extra hole has been drilled. The agent shall then prepare the necessary charge separately for each bore hole. The bore holes shall be thoroughly cleaned before a cartridge is inserted. Only cylindrical wooden tamping rods shall be used for tamping. Metal rods or rods having pointed ends shall never be used for tamping. One cartridge shall be placed in the bore hole and gently pressed but not rammed down. Other cartridges shall then be added as may be required to make up the necessary charge for the bore hole. The top most cartridge shall be connected to the detonator which shall in turn be connected to the safety fuses of required length. All fuses shall be cut to the length required before being inserted into the holes. Joints in fuses shall be avoided. Where joints are unavoidable, a semi-circular niche shall be cut in one piece inserted into the niche.

The two pieces shall then be wrapped together with string. All joints exposed to dampness shall be wrapped with rubber taps.

The maximum of eight bore holes shall be loaded and fired at one occasion. The charges shall be fired successively and not simultaneously. Immediately before firing, warning shall be given and the agent shall see that all persons have retired to a place of safety. The safety fuses of the charged holes shall be ignited in the presence of the agent, who shall see that all the fuses are properly ignited.

Careful count shall be kept by the agent and others of each blast as it explodes. In case all the charged bore holes have exploded, the agent shall inspect the site soon after the test but in case of misfire the agent shall inspect the site after half an hour and mark red crosses (X) over the holes which have not exploded. No driller shall work near such bore until either of the following operations have been done by the agent for the misfired bore-holes.

a) The contractor's agent shall very carefully (when the tamping is a damp day) extract the tamping with a wooden scraper and withdraw the primer and detonator.

b) The holes shall be cleaned for 30 cm of tamping and its direction ascertained by placing a stick in the hole.. Another hole shall then be drilled 15 cm away and parallel to it. This hole shall be charged and fired. The misfired holes shall also explode alongwith the new one.

Before leaving the site of work, the agent of one shift shall inform the another agent relieving him for the next shift, of any case of misfire and each such location shall be jointly inspected and the action to be taken in the matter shall be explained to the relieving agent.

The Engineer-In-charge shall also be informed by the agent of all cases of misfire, their causes and steps taken in that connection.

General Precautions – For the safety of persons red flags shall be prominently displayed around the area where blasting operations are to be carried out. All the workers at site, except those who actually ignite the fuse, shall withdraw to a safe distance of at least 200 meter from the blasting site. Audio warning by blowing whistle shall be given before igniting the fuse.

Being work shall be done under careful supervision and trained personnel shall be employed. Blasting shall not be done within 200 meters of an existing structure, unless specifically permitted by the Engineer-In-charge in writing.

Precautions against misfire – The safety fuse shall be cut in an oblique direction with a knife. All saw dust shall be cleared from inside of the detonator. This can be done by blowing down the detonator and tamping the open end. No tools shall be inserted into the detonator for this purpose.

If there is water present or if the bore-hole is damp, the junction of the fuse and detonator shall be made water tight by means of tough grease or any other suitable material. The detonator shall be inserted into the cartridge so that about one third of the copper tube is left exposed outside the explosive. The safety fuse just above the detonator shall be securely tied in position in the cartridge. Water proof fuse only shall be used in the damp bore-hole or when water is present in the bore-hole.

If a mistake has been found to be due to defective fuse, detonator or dynamite, the entire consignment from which the fuse, detonator or dynamite was taken shall be got inspected by the Engineer-In-charge or his authorised representative before resuming the blasting or returning the consignment.

Precautions against stray currents – Where electrically operated equipment's is used in locations having conductive ground or continuous metal objects, tests shall be made for stray current to ensure that electrical firing can proceed safely.