

## List of Consultancy from Industry

	Name of the faculty	Project Title	Project Type Research/Consultancy	Funding Agency	Amount	Duration
1	Prof. N. R. Thote Prof. R. R. Yerpude Dr. A.K. Agarwal Dr. R. D. Lokhande Dr. S. Panchal Dr. Y.B. Katpatal	Scientific Study of slope failure in DRC OC Mine.	Consultancy	WCL	6.08 L	3-4 months
2	Prof. N. R. Thote Prof. R. R. Yerpude Prof. I.L.Muthreja Dr. S.S. Gupte Dr. A.K. Agarwal Dr. R. D. Lokhande Dr. S. Panchal Dr. N. Sirdesai	HR competency test for engineer	Consultancy	MOIL	1.29 L	3 months
3	Prof. I.L.Muthreja Prof. R. R. Yerpude Prof. N. R. Thote Dr. A.K. Agarwal Dr. R. D. Lokhande Dr. S. Panchal	Scientific Investigation into the Design of External and Internal Dumps of Padmapur Opencast Mine	Consultancy	WCL	2.95 L	6 months
4	Prof. N. R. Thote Dr. S. Panchal Dr. N. Sirdesai	Scientific study of support design of Nehariya and Mathni mines	Consultancy	WCL	8.43 L	Ongoing
5	Prof. N. R. Thote Dr. S. Panchal Dr. N. Sirdesai	Scientific study of support design of Manganese mines	Consultancy	Radiant Minerals	3.74 L	Ongoing
6	Prof. N. R. Thote Prof. Ingle Dr. A.K. Singh	High shaft sinking of Balaghat & Gumgaon mines	Consultancy	MOIL	61.36 L	Ongoing
7	Prof. N. R. Thote	Powder Factor and fragmentation of DOC & POC mines	Consultancy	WCL	8.09 L	6 months
8	Prof. N. R. Thote Dr. N. Sirdesai	Estimation of Drillability Index and other geo-mechanical parameters Tandsi Mines	Consultancy	WCL	0.21 L	2 months
9	Prof. N. R. Thote Prof. Y. B. Katpatal	Blast vibration and strata monitoring of irrigation deptt for bridge	Consultancy	P.W.D	1.25 L	3 months
10	Prof. N. R. Thote	RMR and support design guidelines for their mines of steatite mines of Ananthpur	Consultancy	M/S Indra Minerals, Rayalacherulu, Ananthpur District (A.P.)	2.79 L	6 months
11	Prof. I. L.Muthreja Prof. R. R. Yerpude	Slope Stability Analysis of Failure of Benches in	Consultancy	Chhindwara Mines Ltd, Sausar	2.41 L	6 months

	Dr. A.K. Agarwal	Gowari Wadhona Manganese Mine				
12	Dr. R. D. Lokhande Dr. A. K. Agarwal Prof. I. L. Muthreja Prof. R. R. Yerpude	Scientific study to investigate the subsidence and strata control management	Consultancy	WCL	5.98 L	Ongoing
13	Prof. I. L. Muthreja Prof. R. R. Yerpude	Scientific Study for Verification of Ash Dyke Design for slope stability	Consultancy	Geotech Services, Nagpur	0.59 L	3 months
14	Prof. I. L. Muthreja Prof. R. R. Yerpude	Scientific Study for Verification of report on embankment rehabilitation and design of gabion wall by M/s Geotech Services, Nagpur	Consultancy	SEC Railway, Nagpur	0.50	6 months
15	Prof. I. L. Muthreja Dr. A. K. Agarwal Prof. R. R. Yerpude Dr. R. D. Lokhande	Determination of Degree of Gassiness for seam IX of Murpar Underground Mine, WCL	Consultancy	WCL	1.652	6 months
16	Prof. R. R. Yerpude Dr. R. D. Lokhande Prof. I. L. Muthreja Dr. A. K. Agarwal	Examination and evaluation of support system for in house MOIL Ltd. software	Consultancy	MOIL	1.392	3 months
17	Prof. R. R. Yerpude Dr. R. D. Lokhande Prof. I. L. Muthreja Dr. A. K. Agarwal	Scientific Study to ascertain the stability of workings and overlying strata developed below the railway track and railway acquired land at Sarni Mine, Patherkhhera Area, WCL	Consultancy	WCL	4.22	3 months
18	Prof. R. R. Yerpude Prof. I. L. Muthreja Dr. A. K. Agarwal Dr. R. D. Lokhande	Scientific Study to determine slope stability of Benches, ultimate pit slope stability and OB Dump stability analysis at Integrated Baranj Open Cast Mine (IBOCM), Distt. Chandrapur.	Consultancy	EMTA Coal Ltd	4.30	6 months
19	Prof. R. R. Yerpude Prof. I. L. Muthreja Dr. A. K. Agarwal Dr. R. D. Lokhande	Slope Stability Study of Marki Mangali –III, Bhadrawati Distt. Chnadrapur	Consultancy	B S Ispat Ltd	5.55	6 months
20	Prof. R. R. Yerpude Dr. R. D. Lokhande Prof. I. L. Muthreja Dr. A. K. Agarwal	Scientific study to investigate the subsidence impact on surface, support design	Consultancy	WCL	5.98	6 months

Dr. A.A. Kher	and suggest the suitable safe method of complete extraction by caving method in W 1 panel of Chattarpur Mine of Pathakhera Area WCL				
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*Consultancy Report*  
on

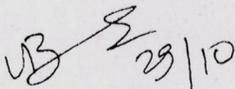
**SLOPE STABILITY OF OVERBURDEN BENCHES AT  
DURGAPUR OPENCAST COAL MINE, CHANDRAPUR AREA,  
WESTERN COALFIELDS LIMITED**

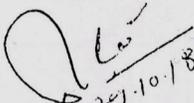
**Coordinator:**

Dr. N. R. Thote,  
Professor & Head

**Co-coordinators:**

1. Dr. R. R. Yerpude
2. Dr. Y. B. Katpatal (*Invited Expert*)
3. Dr. Ajay Agarwal
4. Dr. Ritesh Lokhande
5. Dr. Sandeep Panchal

  
(Dr. V.B. Borghate)  
Dean (R & C)

  
(Dr. N. R. Thote)  
Coordinator & Head  
Head of Department  
Mining Engg. मन्त्र अविश्वविद्यालय  
Visvesvaraya National Institute  
of Technology, Nagpur- 440010

**Department Mining Engineering,  
Visvesvaraya National Institute of Technology,  
Nagpur 440010 (India).**

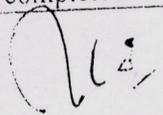
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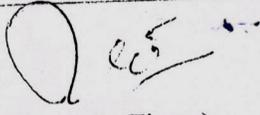
Department of Mining engineering  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**

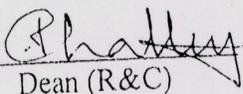
06.02.2018  
 Date 14.8.2017

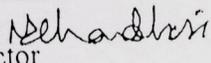
**Format for Consultancy Application**

1.	Name of the Department	MINING
2.	Proposal for Consultancy Work	Scientific study of slope stability at Durgapur opencast mines of Chandrapur Area
3.	Name of the Party	<b>Western Coalfields Limited</b>
4.	Type of Consultancy	Scientific investigations on recent slope failure, stability analysis overburden benches, overall pit slope and method of working of benches near by Lohara fault region in this mine
5.	Name/s of Coordinator/s	<b>Professor N. R. Thote, HOD</b>
	(a) No. of Man-hours involved	50 manhours = Rs 2,16,000.00
	i) Coordinators	Professor N. R. Thote
	ii) Other Faculty Members	Not necessary but one hired project assistance on field
	iii) Other Departmental Staff	-Lab attendance and one hired project assistant
	(b) No. of Visits	4-5 (each visit of 2-3 days)
	i) Faculty Members	Five faculty members, list enclosed
	ii) Others	50 mandays, Rs 1,10,000.00
	(c) Approx. cost of hiring vehicles, project assistance, site consumables, food, printing, photography, misc etc	1,98,000.00 for each mine
	(d) GST @ 18 %	Rs 92880.00
6.	Total Cost of Consultancy	Rs, 5,16,000=00 +(GST) 92880=00 <b>Total cost = 6,08,880.00</b>
7.	Period in which the work is likely to be completed	3 months from award of work

  
 (Dr. N. R. Thote)  
 Coordinator

  
 (Dr. N.R. Thote)  
 Head of Department

  
 Dean (R&C)

Approved / ~~Not Approved~~  
  
 Director

Copy to: Dy.Registrar (Accts.)

54  
 9/2/18

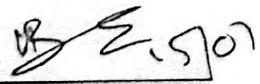
MPLG/338

**Department of Mining Engineering  
Visvesvaraya National Institute of Technology, Nagpur**

**Format for Consultancy Application**

Date 14/1/2019

1.	Name of the Department	Department of Mining Engineering
2.	Proposal for Consultancy Work	Evaluation of Competency of Assistant Manager (Mines) (E-01)
3.	Name of the Party	Manganese Ore India Limited (MOIL)
4.	Type of Consultancy	Evaluation of Competency through HR
5.	Name/s of Coordinator/s	<b>Prof. N. R. Thote</b>
	(a) No. of Man-hours involved	25(hr) X 8 (faculty) = 200 X 500 = Rs. 100000
	i) Coordinators	Prof. N. R. Thote
	ii) Other Faculty Members	(List Enclosed)
	iii) Other Departmental Staff	NIL
	(b) No. of Visits	One
	i) Faculty Members	
	ii) Others	
	(c) Approx. cost of hiring vehicles, project assistance, site consumables, food, printing, photography, misc etc	Rs. 10000.00 (Lump sum)
	(d) GST @ 18 %	Rs. 19800.00
6.	Total Cost of Consultancy	Rs. 100000+10000=110000+19800(GST)=129800 <b>Total cost = 129800.00</b>
7.	Period in which the work is likely to be completed	One week

  
Dean (R&C)

  
(Dr. N. R. Thote)  
Coordinator & Head

Copy to: Dy.Registrar (Accts.)

Head of Department  
Mining Engg. Department  
Date 14/1/2019

Approved / Not-Approved

Director

**DIRECTOR OFFICE**  
File No. 28  
Date 17/1/19



TECHNOLOGY, (Formerly V.R.C.E.) NAGPUR -  
440 010 (INDIA)

Direct : 2601590, 2601591  
Fax : +91-712-225230  
Email : [thote1999@gmail.com](mailto:thote1999@gmail.com)

Department of Mining Engineering

MNG/ E1, 19 447  
Date : 13.03.2019

(Strictly Confidential)

To  
The Director ( Human Resources)  
MOIL Limited,  
MOIL BHAVAN,  
1A, Katol Road, Nagpur 440013

Sub: Bill for consultancy of Competency Test for Assistant Managers of MOIL LTD

Ref: Your letter No. -SDGM/MOIL-D/Per./2018/333 dt. 02.11.2018,

Dear Sir,

Vide above referred letter, the subject work was undertaken by us. Please find enclosed herewith pre receipt bill of the above consultancy work for your kind n.a.

PRE-RECEIPT BILL

Sr. No.	Details of Job	Amount (Rs)
1	Consultancy fees	1,10,000.00
2	GST @ 18%	19800.00
	<b>Total Amount</b>	<b>1,29,800.00</b>

Pro forma Invoice is also enclosed for your ready reference.

Note :

- Amount may be deposited to VNIT bank A/C.(10259420798) (State Bank of India, VRCE Branch Nagpur, IFSC: SBIN0006702) (SAC/HSN Code: 998393) through NEFT RTGS with intimation to the undersigned.
- Income of the Institute is exempted under Section 10(23C)(iiiab) of Income Tax Act 1961

Head of the Department

Dr. N. R. THOTE

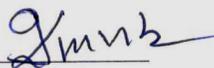
Professor & Head

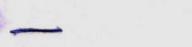
Department of Mining Engineering  
Visvesvaraya National Institute  
of Technology, Nagpur 440010

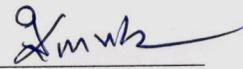
विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Format for Consultancy Application

MNG/1443  
Date: 16/08/2017

1.	Name of the Department	Department of Mining Engineerereng
2.	Proposal for Consultancy Work	Dump stability study at Padmapur OC Mine
3.	Name of the Party	WCL, GM(Safety) Nagpur.
4.	Type of Consultancy	Stability Analysis
5.	Name/s of Coordinator/s	1)Dr I L Muthreja 2)
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	20*8=160 Hrs
	i) Coordinators	160 Hrs*Rs 500/- = <b>Rs 80,000/-</b>
	ii) Other Faculty Members	
	iii) Other Departmental Staff	5 x 8 (Rs.250)= <b>Rs10,000/-</b>
	(b) No. of Visits	
	i) Faculty Members	5*2000/-= <b>Rs10000/-</b>
	ii) Others	
	(c) Testing of samples at NABL approved lab(Geotech Services,Nagpur)	<b>Rs 1,00,000/-</b>
	(c) Approximate TA/DA for site visit, Cost of consumables and other charges, instrumentation etc, if any, required to be borne :	<b>Rs 50,000/-</b>
	(d) Service Charges @ 15%	Rs 250000/-*18%= <b>Rs 45000/-</b>
7.	Total Cost of Consultancy	Rs 250000/- + GSTRs 45000/-= <b>Rs295000/-</b>
8.	Period in which the work is likely to be completed	<b>6</b> months

  
Coordinator (1)

  
Coordinator (2)

  
Head of Department

  
Dean (R&C)

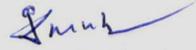
Approved / ~~Not Approved~~  
  
Director  
21/08/17

Team Members:

1. Dr I L Muthreja
2. Dr R R Yerpude
3. Dr N R Thote
4. Dr S S Gupte
5. Dr A K Agarwal
6. Dr R D Lokahsde
7. Prof S Panchal

Terms & Condition:

1. Local Hospitality will be provided by Mine Project
2. Field assistance required will be provided by Mine Project



Coordinator & Head of the Department

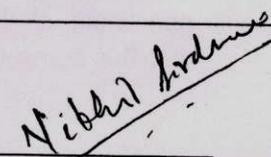
14.2.19

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Format for Consultancy Application

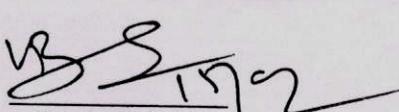
1.	Name of the Department	Mining Engineering
2.	Proposal for Consultancy Work	Conducting scientific study for method of work (depillaring) and support plan for Mathni and Nehria Mine of Pench Area
3.	Name of the Party	Western Coalfield Limited (Pench Area)
4.	Type of Consultancy	Strata monitoring and support design
5.	Name/s of Coordinator/s	1. Dr. N. R. Thote
		2. Dr. Sandeep Panchal
		3. Dr. N. N. Sirdesai
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	70 Man Days
	i) Coordinators	70 x 8 x 500 = 2,80,000
	ii) Other Faculty Members	
	iii) Other Departmental Staff	
	(b) No. of Visits	30 x 2000 = 60,000
	i) Faculty Members	
	ii) Others	
	(c) Approx. cost of consumables, preparation of drawings and report, and assistance for data feeding on computer	1,25,000
	(d) Strata Monitoring Instrumentation	2,50,000
(e) GST (18%)	1,28,700	
7.	Total Cost of Consultancy	8,43,700
8.	Period in which the work is likely to be completed	4 months

  
Dr. N. R. Thote  
Coordinator 1

  
Dr. Sandeep Panchal  
Coordinator 2

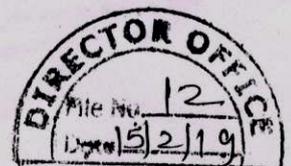
  
Dr. N. N. Sirdesai  
Coordinator 3

  
Dr. N. R. Thote  
Head of the Department

  
Dean (R&C)

Approved / Not Approved  
Director

Copy to: Dy.Registrar (Accts.)





Office of the General Manager  
WESTERN COALFIELDS LIMITED

(A Miniratna – Cat. I Government of India Undertaking)

PENCH AREA

PO:Parasia - 480 441

Distt. : Chhindwara (M.P.)

Mail I D : mcsinha@coalindia.in

Ref. No. WCL/Pench/GM(Opr.)/Scientific Study/2019/ 104

Date : 27.03.2019

WORK ORDER

To

✓  
Visvesvaraya National Institute of Technology,  
Department of Mining Engineering,  
NAGPUR – 440 010

Kind Attn. : Prof. N.R. Thote, Head and Coordinator,

Subject : Work Order for conducting Scientific Study to assess the method of working, support plan and safe operation at Mathani Underground Mine and Naheriya Underground Mine of Pench Area.

Dear Sir,

With reference to your offer No. VNIT/MNG/E-3/19 dated 08.03.2019 received against letter No. WCL/Pench/AGM/2019/67 Dated 01.03.2019 for conducting Scientific Study to assess the method of working, support plan and safe operation at Mathani Underground Mine and Naheriya Underground Mine of Pench Area, we are pleased to award the subject work with the following terms and conditions :-

A) **Scope of Work :**

The scope of work will include scientific strata monitoring and support design through experimental investigation, field visit and discussions with concerned authorities.

Total Cost of Work :

Sl.No.	Conducting Scientific Study at Mathani and Naheriya Underground Mine	Value (in Rs.)
1	Assignment Charges for conducting Scientific Study at Mathani and Naheriya Underground Mine	Rs. 7,15,000.00
	Total	Rs. 7,15,000.00
	GST @ 18 %	Rs. 1,28,700.00
	Grand Total	Rs. 8,43,700.00
	(Rupees Eight Lakhs Forty Three Thousand and Seven Hundred only)	

Handwritten signature

**Terms & Conditions :**

- (i) **Schedule of Payment :** - 50% of Assignment Charges (i.e. Rs.3,57,500.00) shall be made in advance against Proforma Invoice through NEFT / RTGS and balance payment shall be made on submission of final report.

The bank and other details of **Visvesvaraya National Institute of Technology, Nagpur** is as follows :-

Name of Beneficiary : **Visvesvaraya National Institute of Technology, Nagpur**

PAN No. : AAATV9885C

GSTN No. : 27AAATV9885C1ZZ

Bank Name : State Bank Of India, VRCE Branch, Nagpur

Bank Account Number : 10259420798

Bank IFSC Code : SBIN0006702,

Paying Authority : The Area Finance Manager, Pench Area, WCL

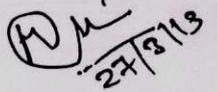
- (ii) Transport and local hospitality for all site visits shall be provided by the WCL.
- (iii) Duration of the study shall be 4 (Four) Months from the date of deposit of advance.
- (iv) GST shall be paid / charged as applicable as per prevailing GST Rules.

Please contact to the Sub Area Manager, Naheriya Sub Area / Concerned Colliery Manager to take up the work.

As a token of acceptance of the above work and conditions, please sign the duplicate copy of this work order and return the same to this office within a week for record.

This issues with the approval of the competent authority.

Yours faithfully,

  
27/3/19

GENERAL MANAGER (OPR.)  
PENCH AREA

Copy to :

- 1) The Area General Manager, WCL, Pench Area – for kind information please.
- 2) The Area Finance Manager, WCL, Pench Area
- 3) The Sub Area Manager, Naheriya Sub Area
- 4) The Area Safety Officer, WCL, Pench Area
- 5) The Manager, Mathani Underground Mine / Naheriya Underground Mine
- 6) The Dy. Manager (Fin/Exp-Audit), Pench Area : B.C. No. WCL/Pench/Area/BD/R/432/Misc.Exp/3327/18-19 dated 27.02.2019 for Rs. 4,21,850.00 and B.C. No. WCL/Pench/Area/BD/R/432/Misc.Exp/3341/18-19 dated 27.02.2019 for Rs. 4,21,850.00

Quotation from VIT.

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From: Arun Deoras (arundeoras@gmail.com)

To: vedanandroy@yahoo.in

Date: Wednesday, 7 August, 2019, 03:49 pm IST

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Res.Sir/ Madam,

Please find attached file for your ready references for **Consultancy work 'Support Design and stoping method of Netra Manganese Ore mines/G, "B" Category, 20 ha'**.

Kindly do the needful & oblige.

Regards,

Arun Deoras



QUTATION REPLY OF MR THOTE.docx  
15.7kB

**Niranjan Thote**

May 17, 2019, 4:44 PM (3 days ago)

to me

To  
M/s Pacific Minerals  
Baihar Road, Balaghat (M.P.)  
4811001  
Through : Shri Arun B. Deoras,  
Mining Consultant, Netra Mines

**Sub: Consultancy work 'Support Design and stoping method of Netra Manganese Ore mines/G, "B" Category, 20 ha'**

**Dear Sir**

We are grateful for the above referred letter. We are pleased to inform that the department of Mining Engineering can undertake the work in the form of a consultancy project. The tentative charges for the consultancy will be Rs 3, 40,000.00 + Rs 61,200 (GST) = [Total: Rs 4, 01,200.00]

The scope of the work will include scientific report and investigation, discussions with authorities and site visits.

**The terms and conditions as per our institutional norms are as follows;**

1. Assignment charges should be deposited in advance. Payment is to be made in the form of DD/Online Transfer in the name of Director, VNIT, Nagpur with the intimation to the undersigned.
2. Transport and local hospitality has to be provided by you for all site visits.
3. Time schedule is to the convenience of the faculty in view of the academic activities. Tentatively it will **4months** from the date of deposit of the advance.

Kindly intimate us your acceptance of the above terms and deposit the amount to the earliest with intimation to undersigned

Thanking you.

**Prof. N. R. Thote**  
Head and Coordinator

# VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY

Accounts Office, Administration Building, South Ambazari road, Nagpur, Maharashtra (India)-440010  
 Contact No: +91712-2801366, Email ID : dr\_acct@vnit.ac.in  
**GSTIN: 27AAATV9885C1ZZ**  
**PAN No.: AAATV9885C**



## Proforma Invoice

Proforma Invoice No:

Proforma Invoice Date: August 8, 2019

### Consultancy Service

Sr. NO.	Service/Item Description	SAC/HSN Code	Qty	Rate	Amount	Discount	Taxable Value
1	Support design and stoping method of Netra manganese ore mines) Advance payment 50% of total consultancy charges Rs 4,01,200.00	998393	1		1,70,000.00	-	1,70,000.00
					<b>Total Amount before Tax</b>		
					Add: CGST (9%)		15300.00
					Add: SGST (9%)		15300.00
					Add: IGST (18%)		
					<b>Total Tax Amount</b>		30,600.00
					<b>Total Amount After Tax</b>		<b>2,00,600.00</b>

Bank Details: State Bank of India, VRCE Branch, Nagpur

Bank A/C : **10259420798**

Bank IFSC: SBIN0006702

**Terms and Conditions:**

1. Income of the Institute is exempt under section 10(23C)(iiiab) of Income Tax Act, 1961
2. All Disputes are subjected to Nagpur Jurisdiction

### Details to be filled By client

**Details of Receiver (Billing Details)**

**Name:**

**Address:**

**GSTIN**

**State:**

**Email Id:**

**PAN No.:**

**Code:**

**Place of Supply along with Complete Address where service is received:**

**State (Place of Supply):**

**State Code (Place of Supply):**

**Contact No:**

Note: This is Proforma invoice. Final Tax invoice shall be issued from Accounts Section at the time of deposit of Funds

**Head of the Department**

**Dean (R & C)**

MMG/03

Dt. 10.04.18

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Proforma for Approval of Consultancy

9.	Name of the Department	Department of Mining Engineering
10.	Proposal for Consultancy Work	Consultancy services for checking / vetting of detailed design, drawings & calculations/specifications in respect of high speed shaft at Balaghat and Gumgaon mines
11.	Name of the Party	GM, (Technical), MOIL Limited Nagpur
12.	Type of Consultancy	checking / vetting of detailed design, drawings & calculations/specifications
13.	Name/s of Coordinator/s	1) Dr N R Thote      2) Dr R K Ingle 4) Dr Arun Kumar Singh      4) Dr M S Ballal
14.	Consultancy Charges Proposed	Rs 15 Lakhs (Mining) + Rs 25 Lakhs (Structural ) + Rs 5 Lakhs (Mechanical) + Rs 5 Lakhs (Electrical)
	(a) No. of Man-hours involved	
	i)	1) Dr N R Thote      3) Dr R K Ingle 2) Dr Arun Kumar Singh      4) Dr M S Ballal
	ii) Other Faculty Members	-
	iii) Other Departmental Staff	-
	(b) No. of Visits	As per Requirement
	i) Faculty Members	1) Dr N R Thote      3) Dr R K Ingle 2) Dr Arun Kumar Singh      4) Dr M S Ballal
	ii) Others	
	(c) Approx. cost of consumables, preparation of drawings and report, and assistance for data feeding on computer	Rs 2 Lakhs
	(d) GST Charges @ 18%	Rs 9.36 lakhs
15.	Total Cost of Consultancy	Rs 52+9.36= 61.36 Lakhs
16.	Period in which the work is likely to be completed	Three years

Dr N R Thote

Through:

Dr R K Ingle

HOD(AM)

Coordinator's

Dr Arun Kumar Singh

HOD (Mechanical)

Dr M S Ballal

HOD(Electrical)

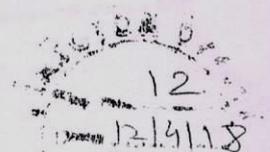
Head of Department (Mining)

Dean (R&amp;C)

Approved / ~~Not Approved~~

Director

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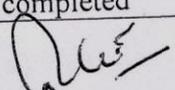
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16.08.2017

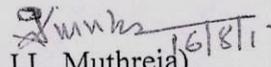
Department of Mining engineering  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR

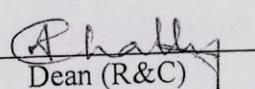
Date 16.8.2017

Format for Consultancy Application

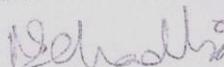
1.	Name of the Department	MINING
2.	Proposal for Consultancy Work	Scientific investigation of Determination of Powder Factor, Optimization of Blast Design and environmental Monitoring of Durgapur OCM and Padmapur OCM of Chandrapur Area of Western Coalfields Limited
3.	Name of the Party	Western Coalfields Limited
4.	Type of Consultancy	Scientific investigations on determination of Powder Factor, fragmentation assessment, optimization of blast design and standardization of blast practices for HOE and Departmental working. It will also include ground vibration, air overpressure and noise measurements and monitoring
5.	Name/s of Coordinator/s	Professor N. R. Thote
	(a) No. of Man-hours involved	39 manhours
	i) Coordinators	Professor N. R. Thote
	ii) Other Faculty Members	Not necessary but one hired project assistance on field
	iii) Other Departmental Staff	-Lab attendance and one hired project assistant
	(b) No. of Visits	10-12 (each visit of 2-3 days)
	i) Faculty Members	30 mandays
	ii) Others	10 mandays
	(c) Approx. cost of hiring vehicles, project assistance, site consumables, food, printing, photography, misc etc	98000.00 for each mine
	(d) GST @ 18 %	Rs 1,23,480.00
6.	Total Cost of Consultancy	Rs, 3,43,000=00 +(GST) each mines, for <b>TWO MINES</b> <b>Total cost = 8,09,480.00</b>
7.	Period in which the work is likely to be completed	3 months from award of work

  
(Dr. N. R. Thote)  
Coordinator

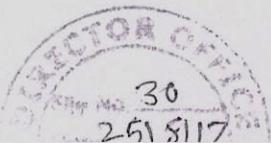
  
(Dr. I.L. Muthreja)  
Head of Department

  
Dean (R&C)

Approved / Not Approved

Director 

Copy to: Dy.Registrar (Accts.)



MNGI  
Dr.

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Format for Consultancy Application

1.	Name of the Department	Mining Engineering
2.	Proposal for Consultancy Work	Estimation of Drillability Index and other Geomechanical Parameters of Rock Specimen from Driving Drift of Tandsi Mines (WCL)
3.	Name of the Party	Western Coalfield Limited
4.	Type of Consultancy	Design and Analysis
5.	Name/s of Coordinator/s	1)Dr. N. R. Thote 2)Dr. N. N. Sirdesai
6.	Consultancy Charges Proposed	18000
	(a) No. of Man-hours involved	6*3000=18000
	i) Coordinators	1) Dr. N. R. Thote 2) Dr. N. N. Sirdesai
	ii) Other Faculty Members	-
	iii) Other Departmental Staff	-
	(b) No. of Visits	1
	i) Faculty Members	1
	ii) Others	-
	(c) Approx. cost of consumables, preparation of drawings and report, and assistance for data feeding on computer	-
	(d)GST (18%)	3240
7.	Total Cost of Consultancy	18000+3240 = 21240
8.	Period in which the work is likely to be completed	15 Days

Coordinator (1)

Coordinator (2)

Head of Department

Dean (R&C)

Approved / Not-Approved

Director

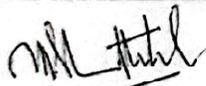
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विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR

Format for Consultancy Application

1.	Name of the Department	Civil Engineering
2.	Proposal for Consultancy Work	Strata Identification and Controlled Blasting for the Pump House under construction near Lower Wardha Project.
3.	Name of the Party	Jain Irrigation System for Executive Engineer, Lower Wardha Project, Arvi Road, Pipri, Wardha
4.	Type of Consultancy	Strata identification and controlled blasting proposal
5.	Name/s of Coordinator/s	1) Dr Y B Katpatal, Civil Engineering 2) Dr. N.R. Thote, Mining Engineering
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	45
	i) Coordinators	1) 45 X 2000 = ₹ 90,000
	ii) Other Faculty Members	
	iii) Other Departmental Staff	
	(b) No. of Visits	Two
	i) Faculty Members	₹8000
	ii) Others	₹2000
	(c) Approx. cost of consumables, preparation of drawings and report, and assistance for data feeding, satellite data, travel	₹6000
	(d) GST Charges @ 18%	₹ 19080
7.	Total Cost of Consultancy	₹ 125080
8.	Period in which the work is likely to be completed	Within One and Half Months of award of consultancy work

   
Y.B. Katpatal N.R. Thote  
Coordinators

  
Dean (R&C)

  
Head of Department  
Dr. N. R. THOTE  
Head of Department  
Department of Mining Engineering  
Visvesvaraya National Institute  
of Technology, Nagpur - 440010

Approved / Not Approved

Director

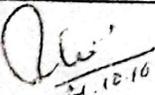
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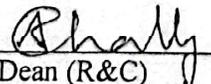


MING 1202/21/10/11

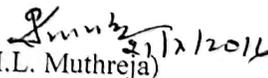
fo'os'oj.;k jk"V<sup>a</sup>h; izkS|ksfxdh laLFkku  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**  
**Format for Consultancy Application**

1.	Name of the Department	MINING
2.	Proposal for Consultancy Work	Scientific investigation of support and method of working of steatite mines of Ananthpur (Dist.) and development of SSR and working guidelines
3.	Name of the Party	Indra Minerals and other leaseholders
4.	Type of Consultancy	Scientific investigations, design of SSR and safety working
5.	Name/s of Coordinator/s	Professor N. R. Thote
6.	Consultancy Charges Proposed	Rs1,29,000.00
	(a) No. of Man-hours involved	28 mandays
	i) Coordinators	Professor N. R. Thote
	ii) Other Faculty Members	Not necessary because the mine is small one level each but they will involve in testing part only
	iii) Other Departmental Staff	-
	(b) No. of Visits	03-5
	i) Faculty Members	-
	ii) Others	-
	(c) Approx (Air travel, rock testing, on site field testing consumables/ labors and transportation charges, expert charges, report writing printing, misc expenditure etc)	1.04,000.00
	(d) Service Charges @ 14%	Rs 34, 950.00
7.	Total Cost of Consultancy	Rs. 2,67,500.00
8.	Period in which the work is likely to be completed	Three months from award of work

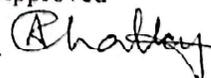
  
 (Dr. N. R. Thote)  
 Coordinator (1)

  
 Dean (R&C)

\_\_\_\_\_  
 Coordinator (2)

  
 (Dr. I.L. Muthreja)  
 Head of Department

✓ Approved / Not Approved

f Director 

Copy to: Dy.Registrar (Accts.)



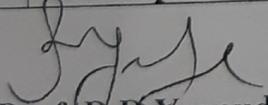
Team Members:

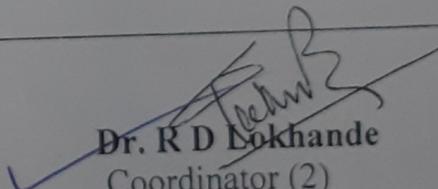
1. Dr I L Muthreja
2. Dr R R Yerpude
3. Dr Y B Katpatal
4. Dr A K Agarwal

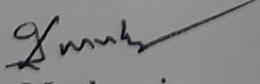
Terms & Condition:

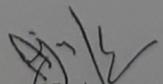
1. Travel arrangement for the field visits will be borne by the Mine Project..
2. Local Hospitality will be provided by Mine Project
3. Field assistance required will be provided by Project

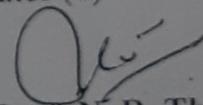
1.	Name of the Department	Department of Mining Engineering	
2.	Proposal for Consultancy Work	To investigate the cumulative impact on subsidence and strata control management at Tawa Mine, Patherkhera Area, WCL	
3.	Name of the Party	Area Safety Officer, Patherkhera Area, WCL	
4.	Type of Consultancy	To investigate the subsidence and strata control management	
5.	Name/s of Coordinator/s	1. Prof. R R Yerpude	2. Dr. R D Lokhande
	Names of Co-coordinators	Dr. I L Muthereja	A K Agarwal
6.	Consultancy Charges Proposed		
	(a) No. of Man-hours involved	180*4=720 Hrs	
	i) Coordinators	720 Hrs*Rs 500/- = Rs 360,000/-	
	ii) Other Faculty Members		
	iii) Other Departmental Staff	20 x 8 *(Rs.250) = Rs 40,000/-	
	(b) No. of Visits		
	i) Faculty Members	16*2000/- = Rs 32000/-	
	ii) Others		
	(c) Approximate DA for site visit, Cost of consumables/testing and other charges, instrumentation etc, if any, required to be borne :	Rs 75,000/-	
	(d) Service Charges (GST) @ 18% of (a), (b) and (c)	Rs 507000/-*18%= Rs 91260/-	
7.	Total Cost of Consultancy	Rs 507000/- + GST Rs 91260/- = Rs 598260/-	
8.	Period in which the work is likely to be completed	3 months	

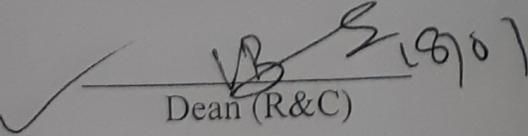
  
Prof. R R Yerpude  
Coordinator (1)

  
Dr. R D Lokhande  
Coordinator (2)

  
Dr. I L Muthereja  
Co-coordinator

  
A K Agarwal  
Co-coordinator

  
Prof. N. R. Thote  
Head of Department

  
Dean (R&C)

Approved / Not Approved

Director

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Consultancy Application

1.	Name of the Department	Department of Mining Engineering	
2.	Proposal for Consultancy Work	Scientific Study for Verification of Ash Dyke Design for slope stability	
3.	Name of the Party	Geotech Services, Nagpur	
4.	Type of Consultancy	Stability study and slope design	
5.	Name/s of Coordinator/s	1)Dr I L Muthreja 2)Dr R R Yerpude	
6.	Consultancy Charges Proposed		
	(a) No. of Man-hours involved		
	i) Coordinators	25 Mandays,	(10 x 8 x 500) = Rs 40,000=00
	ii) Other Faculty Members		
	iii) Other Departmental Staff		
	(b) No. of Visits		
	i) Faculty Members	2man visits x (Rs. 2000)	= Rs. 4000=00
	ii) Others		
	c) Testing of samples at NABL approved lab(Geotech Services,Nagpur)		
	(d) Approx. cost of consumables, preparation of drawings and report. and assistance for data feeding on computer	Rs 6,000/-	
	(d) GST @ 18%	5,0000/-X0.18 = Rs 9000=00	
	Total Cost of Consultancy	Rs 59,000/-	
8.	Period in which the work is likely to be completed	1 months	

*[Signature]*  
14/12/17  
Coordinator (1)

*[Signature]*  
14/12/17  
Coordinator (2)

*[Signature]*  
14/12/17  
Head of Department

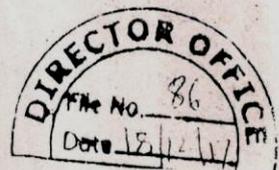
*[Signature]*  
Dean (R&C)

Approved / ~~Not Approved~~

Director *[Signature]*

15/12/17

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**Visvesvaraya National Institute of Technology Nagpur**

Accounts Office, Administration Building

VNIT Campus, South Ambazari Road,

Nagpur (MH) INDIA

GSTIN : 27AAATV9885C1ZZ

PAN : AAATV9885C

E-Mail : dr\_acct@vnit.ac.in

**Receipt Voucher**

RV-3893

Dated 12-Jan-2018

Particulars	Amount
Amount :	
CONSULTANCY DEPOSITS	50,000.00
GST Collection @ 18%	9,000.00

through

SBI A/C NO 10259420798

Account of :

CASH RECEIVED FROM GEOTECH SERVICES  
NAGPUR GSTIN : 27AEWPS1989J1ZE FOR  
CONSULTANCY FOR MINING ENGG

Amount (in words) :

INR Fifty Nine Thousand Only

Rs 59,000.00

Authorised Signatory



MNB/7/13

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**  
**Consultancy Application**

1.	Name of the Department	Department of Mining Enginerering
2.	Proposal for Consultancy Work	Scientific Study for Verification of report on embankment rehabilitation and design of gabion wall by M/S Geotech Services, Nagpur
3.	Name of the Party	Dy Chief Engineer(Con)/GC, SEC Railway, Nagpur
4.	Type of Consultancy	Stability study and slope design
5.	Name/s of Coordinator/s	1)Dr I L Muthreja 2)Dr R R Yerpude
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	
	i) Coordinators	10 Mandays, (10 x 8 x 500) = Rs 40,000=00
	ii) Other Faculty Members	
	iii) Other Departmental Staff	
	(b) No. of Visits	
	i) Faculty Members	2man visits x (Rs. 2000) = Rs. 4000=00
	ii) Others	
	c) Testing of samples at NABL approved lab(Geotech Services,Nagpur)	
	(d) Approx. cost of consumables, preparation of drawings and report, and assistance for data feeding on computer	Rs 6,000/-
	(d) GST @ 18%	50,000/-X0.18 = Rs 9000=00
7.	Total Cost of Consultancy	Rs 59,000/-
8.	Period in which the work is likely to be completed	1 months

*[Signature]*  
 27/9/2019  
 Coordinator (1)

*[Signature]*  
 27/09/19  
 Coordinator (2)

*[Signature]*  
 27/9/2019  
 Head of Department

*[Signature]*  
 Dean (R&C)

Approved / Not Approved

Director *[Signature]*



Office of the Chief Engineer(Con.)  
SOUTH EAST CENTRAL RAILWAY  
3rd floor, D.R.M.'s Office, Kingsway, Nagpur- 01.(M.S.)



**A. K. Singh (IRSE)**  
Dy.Chief Engineer/Con/GC

FAX – 0712-2552658  
Email: [aks.irse@gov.in](mailto:aks.irse@gov.in)

No. DCE/C/GC/NGP/Drg./8890

Date: 25.09.2019

To,  
The Director/VNIT  
VNIT  
NAGPUR

**(Kind attention: Dr. I.L. Muthreja, Department of Mining)**

**Sub:** Proof checking of embankment rehabilitation and gabion wall.

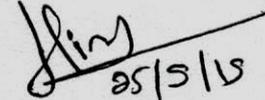
\*\*\*\*\*

With reference to above subject, you are requested to proof check the report on embankment rehabilitation and design of gabion wall with reference to Chhindwara-Nagpur GC Project of S.E.C. Railway which was done by M/s Geo-tech Services Pvt. Ltd. Nagpur.

Please treat the matter very urgent.

Thanking you.

Encl:- As above

  
25/9/19

**[A. K. Singh]**  
Dy. Chief Engineer (Con)/GC  
S. E. C. Railway, Nagpur

Copy to: CE/Con/NGP for kind information please.

MNS/590

विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**  
**Format for Consultancy Application**

1.	Name of the Department	Department of Mining Engineering
2.	Proposal for Consultancy Work	Determination of Degree of Gassiness of Seam IX of Murpar u/g mine, WCL.
3.	Name of the Party	Colliery Manager, Murpar u/g mine, Umrer WCL, . Nagpur.
4.	Type of Consultancy	Determination of Degree of Gassiness of coal seam
5.	Name/s of Coordinator/s	1)Dr I L Muthreja 2)Dr A K Agarwal
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	50*4=200 Hrs
	i) Coordinators	200 Hrs*Rs 500/- = Rs 1,00,000/-
	ii) Other Faculty Members	
	iii) Other Departmental Staff	20 x 2 *(Rs.250)= Rs 10,000/-
	(b) No. of Visits	
	i) Faculty Members	10*2000/-= Rs 20000/-
	ii) Others	-
	(c) Approximate Cost of consumables and other charges, instrumentation etc, if any, required to be borne :	Rs 10,000/-
	(d) GST @ 18% (of a+b+c)	Rs 140000/-*18%= Rs 25200/-
7.	Total Cost of Consultancy	Rs 140000/- + GST Rs 25200/-= Rs 165200/-
8.	Period in which the work is likely to be completed	3 months

*I L Muthreja*  
 16/5/2019  
**(Dr. I. L. Muthreja)**  
 Coordinator (1)

*A K Agarwal*  
 16/5/2019  
**(Dr. A. K. Agarwal)**  
 Coordinator (2)

*N. R. Thote*  
 29/5/19  
**(Prof. N. R. Thote)**  
 Head of Department  
 I/C HOD

*[Signature]*  
 29/5/19  
 Dean (R&C)

Approved / ~~Not Approved~~

Director

Copy to: Dy. Registrar (Accts.)

**Team Members:**

1. Dr I L Muthreja *[Signature]*
2. Dr A K Agarwal *[Signature]*
3. Dr R R Yerpude *[Signature]*
4. Dr R D Lokhande *[Signature]*

**Terms & Condition:**

1. Transport from Nagpur to mine and back will be provided by Mine Project
2. Local Hospitality will be provided by Mine Project
3. Field assistance required will be provided by Mine Project





"Under the jurisdiction of Nagpur Court Only"

वेस्टर्न कोलफील्ड्स लिमिटेड  
WESTERN COALFIELDS LIMITED  
(A Govt. of India Undertaking)  
Website <http://westerncoal.nic.in>

OFFICE OF THE DY.G.M.(MIN)/SAM,  
MURPAR SUB AREA, UMRER AREA  
PO. KHADSANGI, PS. CHIMUR,  
DISTT. CHANDRAPUR(MS) - 442906  
CIN OF WCL U10100MH1975GO1018626  
PH.NO. 07170-230101/230102/263380  
Email: [wclmurpar@gmail.com](mailto:wclmurpar@gmail.com)

कार्यालय कोल इस्टेट, सिविल लाईन्स, नागपुर - 440001

Redg. Office Coal Estate, Civil Line, Nagpur - 440001

Ref. No. WCL: SAM: MUR-UG: MGR: 2019: 227

Date: - 10.05.2019

To,  
HOD (Department of Mining Engg),  
Visvesvaraya National Institute of Technology,  
Nagpur-440010, India.

Subject: - Regarding determination of Degree of Gassiness of Seam IX of Murpar u/g mine.  
Kind Attention to:- Dr. I L Muthreja / Dr A K Agarwal

Respected Sir,

As per discussion with our higher authority and directives laid down by the DGMS, we have to get the air sample drawn from borehole of Seam IX and get it analyzed to ascertain the percentage of inflammable gas and on the basis of it you have to declare the Degree of Gassiness from the air sample collected from the said borehole. The entire operation is to be carried out, from collection of air sample from borehole and analysis of percentage of inflammable gas i.e. CH<sub>4</sub> and declaring Degree of Gassiness by your agency or team. You are hereby requested to send the estimate of the expenditure for the entire operation considering it as most urgent.

Thanking You.

Yours faithfully,

*SB*  
10/05/2019  
Colliery Manager  
Murpar u/g mine  
Murpar Sub Area,  
Umrer Area,  
M/s Western Coalfields Limited.

To Prof. I. L. Muthreja

Dr. Agarwal  
for n.a.

*Shankar*  
10/5/2019

A { letter is to HOD, may hence it  
should be marked by HOD, may to lead  
attention person faculty  
b) Pl. attach original letter

letter received by E-mail.

*Qe*  
5/5/19

## ANNEXURE-2A

**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY**

Accounts office, Administration Building, South Ambazari road,  
Nagpur, Maharashtra (India) - 440010  
Contact No: +91 712-2801366 , Email ID: dr\_acct@vnit.ac.in  
GSTIN: 27AAATV9885C1ZZ PAN No: AAATV9885C

**Proforma Invoice**

Proforma Invoice No: Consultancy/ MNG/01\_MOIL

Proforma Invoice Date: 09/10/2020

Testing Service

Consultancy Service

S. No.	Service/item Description	SAC/HSN code	Qty	Rate	Amount	Discount	Taxable Value
1	Final bill for scientific study for Examination & Evaluation of support system prepared by using in-house developed MOIL RMR software	998393	1	118000	118,000.00		118,000.00

Bank Details

Total Amount before Tax

118,000.00

Bank A/C: 10259420798

Add: CGST (9%)

10,620.00

Bank IFSC: SBIN0006702

Add: SGST (9%)

10,620.00

Terms and Conditions:

1. Income of the Institute is exempt under Section 10 (23C) (iiiab) of Income Tax Act, 1961.

2. All disputes are subject to Nagpur Jurisdiction

Add: IGST (18%)

Total Tax Amount

21,240.00

Total Amount after Tax:

139,240.00

**Details to be filled By client****Billing Details**

Name: M/s MOIL

Address: Katol Road, MOIL, Nagpur

Place of Supply alongwith Complete address where service is received:

GSTIN:

State (Place of Supply):

State: Maharashtra

Code

State Code (Place of Supply):

Email Id: ggmanekar61@gmail.com

Contact No: 9403115155

Note: This is Proforma invoice. Final Tax invoice shall be issued from Accounts Section at the time of deposit of Funds.

*[Handwritten Signature]*

*[Handwritten Name: Dr. Rajendra Yempate]*



**CONFIDENTIAL**  
(For internal Circulation only)

**Report  
on  
Examination and evaluation of support system for in-  
house MOIL Ltd. software**

**Referred by: M/s MOIL**



**Department of Mining Engineering  
Visvesvaraya National Institute of Technology  
Nagpur**

**CONFIDENTIAL**  
(For internal Circulation only)

**Report  
on**

**Examination and evaluation of support system for in-  
house MOIL Ltd. software**

**Referred by: M/s MOIL**

**Period of Investigation : March 2020-October 2020**

**Investigators:**

**Dr R R Yerpude – Coordinator 1  
Dr R D Lokhande – Coordinator 2  
Dr I L Muthreja - Co-coordinator  
Dr A K Agarwal - Co-coordinator**

  
**Dr R R Yerpude**  
**Coordinator 1**  
15/11/20

  
**Dr Ritesh D Lokhande**  
**Coordinator 2**  
15/10/20

  
**Head of the Dept.**  
15/11/2020

  
**Dean (R&C)**

**Department of Mining Engineering  
Visvesvaraya National Institute of Technology  
Nagpur**

## Contents

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About the MOIL Ltd. Software	1
About the Gumgaon Mine	2
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Suggestions and Recommendations	9



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# Examination and evaluation of support system for in-house MOIL software

## Introduction:

MOIL Ltd. authorities requested VNIT to carry out studies for Examination and evaluation of support system for in-house MOIL software (vide letter no. 9700000125/555 dated: 20/03/2020), results of which are used for the case of Gumgaon Mine support design.

## About the MOIL Ltd. software:

MOIL has developed in-house software which is really commendable for computation of RMR and Q values which are used for the support design using the empirical relation developed by Bieniawski and Barton respectively. Software is a synchronous effort of MOIL to bring everything related to support design on single platform. This gives the guidelines for the Mining Engineers for the support design and this approach is accepted worldwide for the support design. This software has got all these features and works on the WINDOWS interface.

MOIL has arranged the demonstration of the software in the Department of Mining Engg., VNIT, Nagpur and explained all the features.

Correctness of output of any software is depends upon how correct is input. Since the input to this software is from the sampling and parametric studies from the field rock, therefore always there is a possibility of deviation of Input. This results in different output. Moreover, all parameters required to get the output cannot be determined due to field restrictions hence suitable relevant values of few parameters have to be assumed. This may change the support requirement and design.

Therefore, it is suggested that software output should always be validated by Mining Expert from Institute or from the Industry, before adopting the values of RMR, Q and support design parameters.

It is suggested that software may include Expert System to make it really usable by field Mining Engineers and its documentation should also be made available.

This software can be further augmented based on requirement of field Mining Engineers.



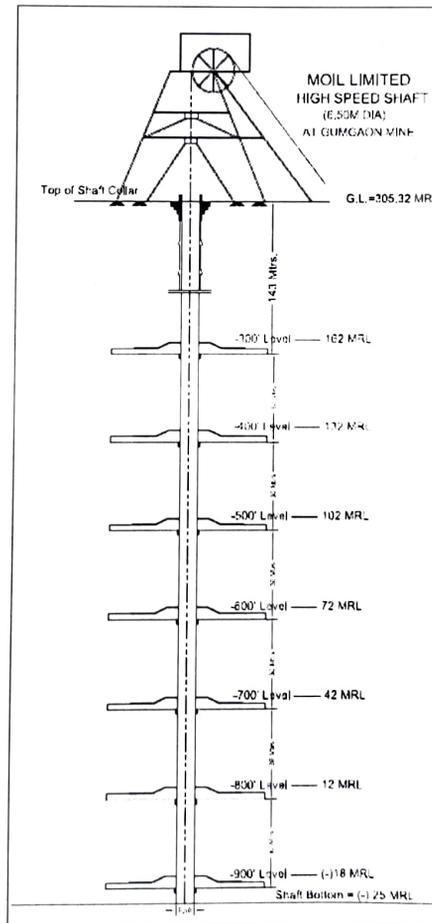
**About the Gumgaon Mine:**

The location of high speed vertical shaft is situated in lease of 35.97ha at Ch.5300. This shaft will serve as a winding shaft for other leases at Gumgaon Mine which are 1.33 ha and 48.596 ha.

This high speed vertical shaft of 6.5m finished diameter have 07 nos. insets at the following intermediating levels for entrance and manganese ore extraction by the underground mining operation only. The total depth of vertical shaft is 343 m below the surface. The details of the depth and levels are tabulated below in Table.1 and shown in Fig.1

**Table1:** The details of the depth and levels

Level	Surface	(-)300'L	(-)400'L	(-)500'L	(-)600'L	(-)700'L	(-)800'L	(-)900'L	Shaft Bottom
MRL	305	162	132	102	72	42	12	(-) 18	(-) 38
Depth from Surface (m)	0	143	173	203	233	263	293	323	343



**Fig.1:** Proposed L section of high speed vertical shaft located at Ch.5300



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### Dimensions of various drift development

Shaft In-set: Excavation 6.5 m (w) x 5.5 m (h) Finished 5.5 m (w) x 5.0 m (h) in both sides Length: 15 m from shaft centre. The opening of excavation begins with max. height of 5.5 m and with the sloping gradient it will terminate for the height of 4.5 m and total length of this excavation will be 4.0 m and thereafter it will continue for further 7.75 m with excavation size of 6.5 m x 4.5 m. Engineering drawing with plan and section of shaft inset is given below in Fig. 2 and 3. The proposed inset of 15 m will be further developed by additional cross cuts begins with this will be 1225 per running meter at various levels and shown in the Fig.4. These development headings will reach up to manganese ore body from footwall and will be terminated by contractor.

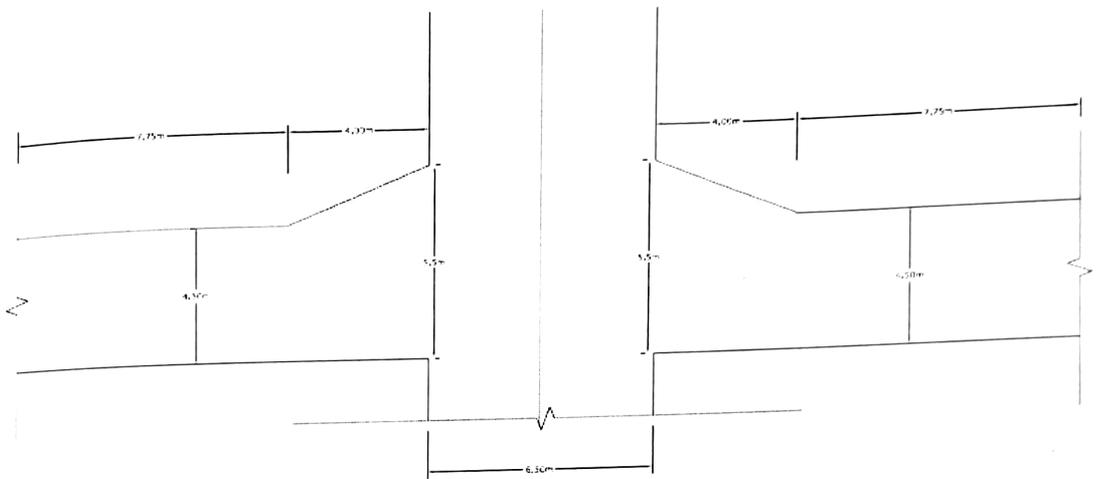


Fig.2: Section of Inset Excavation

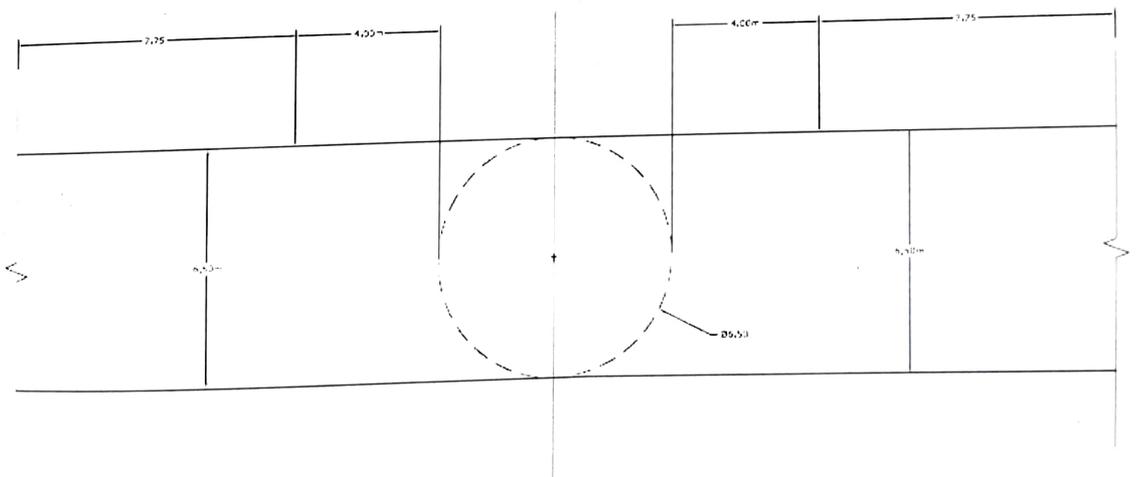


Fig.3: Plan of Inset Excavation



*GR*

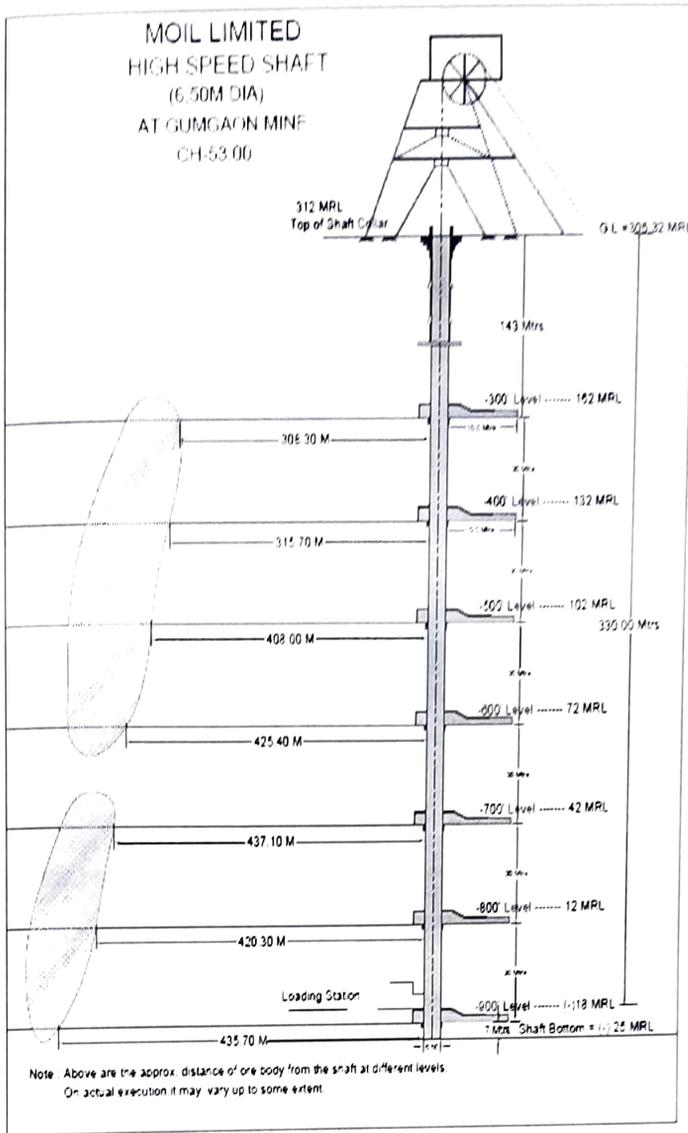


Fig.4: Approx. distance of ore body from x-cut

Support design of Gumgaon Mine made by MOIL Ltd. based on software values and other computation:

#### Geo-technical Properties:

The Geo-technical Properties of hangwall rock, orebody and footwall is being tested as per the ISRM standard at CMRI, Nagpur. The tested Geo-technical Properties are given below in

Table 2: Geo-technical Properties

Rock Type	Compressive Strength, MPa	Tensile Strength, MPa	RMR
Phyllite H/W	120 - 173	9.86 -14.48	76-71
Phyllite below F/W	113 - 153	NA	76



*Av. RMR 73.5 is considered for estimation of drift support.*

Specific gravity: 2 – 2.4 gm/cc, as the development in footwall 2.2 gm/cc is considered.

Considering span width - maximum 6.5 m,

Load is estimated by using following equation after (Unal, 1993)

$$\text{Rock Load} = \frac{[100 - \text{RMR}] \times B \text{ (Width)} \times \text{density}}{100}$$

B = width of the excavation is considered as 6.5

$$= \frac{[100 - 73.5]}{100} = 0.265 \times 6.5 \times 2.20 = 3.79 \text{ t/m}^2$$

**Estimated rock load 3.79 t/m<sup>2</sup>**

To calculate the support resistance by roof bolt of 1.5 m length following assumptions have been considered;

- Roof bolt of 1.5 m length
- Fully cement grouted with cement/resin capsules
- Support is considered as a temporary support

**Considered carrying capacity of cement grouted roof bolt 6 t and 8 t for resin grouted**

Considering the temporary installation of support, roof bolt across the drift is considered 5 in grid pattern of 1.2 m.

Support resistance by cement grouted roof bolts

$$\frac{5 \text{ (number of roof bolts)} \times \text{Load carrying capacity (6 t)}}{6.5 \text{ (width of drift in m)} \times 1.2 \text{ Row spacing in m}} = \frac{30}{7.8} = 3.85 \text{ t/m}^2$$

Support resistance by resin grouted roof bolts

$$\frac{5 \text{ (number of roof bolts)} \times \text{Load carrying capacity (8 t)}}{6.5 \text{ (width of drift in m)} \times 1.2 \text{ Row spacing in m}} = \frac{40}{7.8} = 5.13 \text{ t/m}^2$$

Factor of safety with recommended **cement grouted roof bolt** is

$$\text{Calculated support resistance/rock load} = 3.85/3.79 = 1.02$$



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Factor of safety with recommended **resin grouted roof bolt** is

Calculated support resistance/rock load/ =  $5.13/3.79 = 1.35$

As the excavation of the shaft inset drift is temporary because RCC will be erected hence looking into the temporary drift development 1.5 m length cement grouted and alternative with resin is proposed in grid pattern of 1.2 m.

### Rockmass failure by considering in-situ stresses:

In the absence of in-situ stress measurements in and around Gumgaon Mine, the in-situ horizontal stresses are estimated from the rock's elasticity modulus.

The modulus of elasticity (E) is considered 15 GPa in this case.

To obtain the horizontal stresses the Sheorey's equation is used:

- $SH = 4.8 + 0.0138H$
- $SH = 3.2 + 0.0122H$
- $SH = 6.4 + 0.0154H$
- $SV = 0.027H$

Where, SH = average horizontal stress (MPa)

SV = Vertical stress (MPa) and

Depth cover in (m) - considered from 143 m to 323 m

Using the above equations, the calculated values of SH are tabulated below in Table 3.

**Table 3:** Horizontal and Vertical stress at Gumgaon Mine

Level	Surface	(-)300'L	(-)400'L	(-)500'L	(-)600'L	(-)700'L	(-)800'L	(-)900'L	Shaft Bottom
mRL	305	162	132	102	72	42	12	(-) 18	(-) 38
Depth from Surface (m)	0	143	173	203	233	263	293	323	343
Sheorey's Equation									
$SH = 4.8 + 0.0138 H$	4.8	6.77	7.19	7.60	8.02	8.43	8.84	9.26	9.53
$SH = 3.2 + 0.0122 H$	3.2	4.94	5.31	5.68	6.04	6.41	6.77	7.14	7.38
$SH = 6.4 + 0.0154 H$	6.4	8.60	9.06	9.53	9.99	10.45	10.91	11.37	<b>11.68</b>
$SV = 0.027 H$	0	3.86	4.67	5.48	6.29	7.10	7.91	8.72	<b>9.26</b>

Based on the above equation, the maximum horizontal stress is estimated as 11.68 MPa and maximum vertical stress is 9.26 MPa with depth cover of 343 m.

Considering FOS = 1.5 and load bearing capacity of 8T was assumed for resin rock bolt of 1.5m length.

The above data/ calculations also got verified through software for RMR & Rock classes etc.



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## RECOMMENDATION OF SUPPORT DESIGN BY MOIL LIMITED BASED ON ABOVE STUDY:

- To safe guard the drift of width 6.5 m, in row 5 resin bolts at a spacing of 1.2 in grid pattern is recommended with bearing plate (150x150x6) mm size.
- Shaft inset should be furnished with RCC slab of 30 cm with grade M25 concrete.
- Whenever difficult Geo-mining condition observed, shotcrete of 50mm thickness with wire mesh and roof bolt should be followed.

## VNIT OBSERVATIONS FOR SOFTWARE AND GUMGAON MINE SUPPORT DESIGN:

1) As per the calculations provided by MOIL through software, the average RMR given by MOIL is 73.5 and has variation when the RMR calculated by VNIT which is found to be 67 with the parameters provided by MOIL. As a result, support design is not exactly matching for the calculations when it is done by VNIT through the empirical formula.

2) Estimation of Rock Load :

Rock load was estimated for Decline, crosscut, crosscut junctions and ore trough/drive roadways using following equations:

$$\text{Rock load (t/m}^2\text{)} = \text{B.D.} \cdot [(100 - \text{RMR})/100] \quad (\text{Unal, 1993})$$

where, B = Span width (m), and  
D = Dry density (t/m<sup>3</sup>).

In the study area,

RMR = 73.5  
Density of roof rocks, D = 2.2 t/m<sup>3</sup>, and  
Width of gallery, B = 6.5 m

**Estimated Rock Load is 3.8 t/m<sup>2</sup> (MOIL RMR 73.5)**

**And the rock load with 67 RMR is 4.72 t/m<sup>2</sup> (VNIT RMR 67)**

At many occasions, Unal formula is used by hard rock coal mines in USA and other countries.

3) VNIT calculation for Factor of Safety

The geotechnical studies revealed that the Bieniawski's Rock Mass Classification System for immediate roof rocks evaluated is **73.5** by **MOIL** which categories the roof rocks to Class II, "**good roof condition** " Based on the evaluated RMR, and 5 bolts are



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considered by MOIL for support design, the safety factor is determined for cement capsule bolt (6T) is given for the following locations as discussed below.

Considering the spacing between the bolts is 1.2m and then total rock load comes-

Area = Width (Span) X Bolt Spacing

$$\begin{aligned} \text{Area} &= 6.5 \times 1.2 \\ &= 7.8 \text{ sq m} \end{aligned}$$

The load is acting in total area:

$$\begin{aligned} \text{Load} &= \text{Area} \times \text{Rock Load} \\ &= 7.8 \times 3.8 \\ &= 29.64 \text{ T} \end{aligned}$$

**Factor of Safety (FoS) is assumed as 1.0**, then

Load X FoS

$$29.64 \times 1.0 = 29.64 \text{ T}$$

**A cement bolt carrying capacity is 6 T**

So, total number of bolts required for 1.0 FoS

$$29.64/6 = 4.94 \text{ bolts (Appox. 5 bolts)}$$

**A resin bolt carrying capacity is 8 T**

So, total number of bolts required for 1.0 FoS

$$29.64/8 = 3.71 \text{ bolts (Appox. 4 bolts)}$$

**Factor of Safety (FoS) is assumed as 1.2**, then

Load X FoS

$$29.64 \times 1.2 = 35.56 \text{ T}$$

**A cement bolt carrying capacity is 6 T**

So, total number of bolts required for 1.2 FoS

$$35.56/6 = 5.92 \text{ bolts (Appox. 6 bolts)}$$



*A resin bolt carrying capacity is 8 T*

So, total number of bolts required for 1.2 FoS

$$29.64/8 = 4.45 \text{ bolts (Appox. 5 bolts)}$$

- 4) In general, the recommendation of 5 bolts with cement capsule in 6.5 m span of drift with 1.2 m of spacing in between the rock bolt given by MOIL is having threshold factor of safety (FoS – 1.0).
- 5) Therefore VNIT is recommending at 6 bolts with cement capsule in 6.5 m span of drift or go with resin capsule bolts with 5-6 bolts in a row with 1.2m spacing for higher factor of safety more than 1.2.

The results given by MOIL and checked by VNIT and inferred that there is a variation of software output and actual output through empirical formulas. The safety factor calculated by MOIL has variation with VNIT calculations but safety factor is little more than 1.0 despite variation but higher safety factors are always recommended.

#### **Suggestions and Recommendations:**

1. The software output should always be validated and verified by Mining Expert from the Institution or from the Industry before using the same for the support design.
2. Wherever possible, numerical modeling techniques should be used rather than empirical relationship to get clear picture of rock mass and stresses.
3. Gumgaon Mine support design should be tested with type of bolts before implementing in the field.
4. Six grouted rock bolts of 6T anchorages may be used or else resin bolts of high anchorage capacity should be used to reduce the number and for improving Factor of Safety.
5. If possible rock bolts should be provided with “W” steel straps along the x-section of roadway to give better strength to the support wherever rock conditions are likely to change.
6. Roof monitoring plan should be prepared for and locating any deformation in roof rock in the future.
7. MOIL recommendation for shaft inset should be followed that it should be furnished with RCC slab of 30 cm with grade M25 concrete. Whenever difficult Geo-mining condition observed, shotcrete of 50mm thickness with wire mesh and roof bolt should be followed.

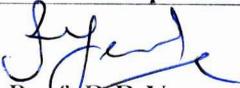


विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Format for Consultancy Application

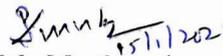
Ref: MNG/E-02/21/31

Date: January 15, 2021

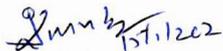
1.	Name of the Department	Department of Mining Engineering	
2.	Proposal for Consultancy Work	Scientific Study to ascertain the stability of workings and overlying strata developed below the railway track and railway acquired land at Sarni Mine, Patherkhera Area, WCL	
3.	Name of the Party	Area Survey Officer, Patherkhera Area, WCL	
4.	Type of Consultancy	To ascertain the stability of workings.	
5.	Name/s of Coordinator/s	1. Prof. R R Yerpude	2. Dr. R D Lokhande
	Names of Co-coordinators	Dr. I L Muthereja	A K Agarwal
6.	Consultancy Charges Proposed		
	(a) No. of Man-hours involved	150*4=600 Hrs	
	i) Coordinators	600 Hrs*Rs 500/- = Rs 3,00,000/-	
	ii) Other Faculty Members		
	iii) Other Departmental Staff	15 x 8 *(Rs.250) = Rs 30,000/-	
	(b) No. of Visits		
	i) Faculty Members	16*2000/- = Rs 32000/-	
	ii) Others		
	(c) Approximate DA for site visit, Cost of consumables/testing and other charges, instrumentation etc, if any, required to be borne :	Rs 60,000/-	
	(d) Service Charges (GST) @ 18% of (a), (b) and (c)	Rs 422000/-*18%= Rs 75960/-	
7.	Total Cost of Consultancy	Rs 422000/- + GSTRs 75960/-= Rs 497960/-	
8.	Period in which the work is likely to be completed	3 months	

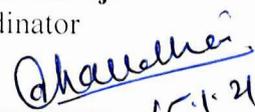
  
Prof. R R Yerpude  
Coordinator (1)

  
Dr. R D Lokhande  
Coordinator (2)

  
Dr. I L Muthereja  
Co-coordinator

  
A K Agarwal  
Co-coordinator

  
Dr. I L Muthreja  
Head of Department

  
Dean (R&C)

Approved / Not Approved

Director



MN4/21/65

**विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान**  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**  
**Format for Consultancy Application**

1.	Name of the Department	Department of Mining Engineering
2.	Proposal for Consultancy Work	Scientific Slope Stability Study of benches and dumps of INTEGRATED BARANJ OC (IBOC) Coal Mine, M/s Karnataka EMTA Coal Mines Ltd. Tah. Bhadravati, Dist: Chandrapur
3.	Name of the Party	Mine Manager IBOC, Bhadravati, Dist: Chandrapur M/s Karnataka EMTA Coal Mines Ltd,
4.	Type of Consultancy	Stability Analysis of pit slope, dumps and monitoring
5.	Name/s of Coordinator/s	Dr R R Yerpude, Dr I L Muthreja
	Names of Co-coordinators	Dr R D Lokhande Dr A K Agarwal
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	50*8=400 man-Hrs
	i) Coordinators	400 Hrs*Rs 500/- = Rs 2,00,000/-
	ii) Other Faculty Members	
	iii) Other Departmental Staff	20 x 8 (Rs.250)= Rs40,000/-
	(b) No. of Visits	
	i) Faculty Members	20*2000/-= Rs40000/-
	ii) Others	
	(c) Collection-Testing of samples (NABL Approved Lab: Geotech)	Rs 1,00,000/-
	(c) Approximate Travel expenses by hired vehicle, DA for site visit, Cost of consumables and other charges, instrumentation etc, if any, required to be borne :	Rs 50,000/-
	(d) GST @ 18%	Rs 4,30,000/-*18%= Rs 77400/-
7.	Total Cost of Consultancy	Rs 4,30,000/- + GST Rs 77400/-= Rs 5,07,400/-
8.	Period in which the work is likely to be completed	3-4 months / based on availability of data

*[Signature]*  
 (Dr R R Yerpude)  
 Coordinator

*[Signature]*  
 (Dr I L Muthreja)  
 Coordinator & Head of Department

(Dr R D Lokhande)  
 Co-coordinator (1)

*[Signature]*  
 (Dr A K Agarwal)  
 Co-coordinator (2)

*[Signature]*  
 23/2/21  
 Dean (R&C)



Approved / Not Approved  
 Director

# Report

on

Scientific Study of Slope Stability of Benches and Dumps of  
Integrated Baranj Opencast (IBOC) Coal Mine of Karnataka Power  
Corporation Limited, Tah.- Bhadravati, Distt. -Chandrapur, (MS)

Referred by: M/s Emta Coal Ltd.

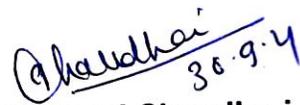
Period of Investigation : May 2021- September 2021

Investigators :

Dr. Rajendra Yerpude, Coordinator  
Dr. I.L.Muthreja, Coordinator  
Dr. Ajay Kumar Agarawal, Co-coordinator  
Dr. Ritesh Lokhande, Co-coordinator

  
Dr. Rajendra Yerpude  
Coordinator

  
Dr I L Muthreja  
Head of the Dept.

  
Dr Ms Madhuri Chaudhari  
Dean( R&C)

Dept. of Mining Engineering  
Visvesvaraya National Institute of Technology  
Nagpur



Report

on

Scientific Study of Slope Stability of Benches and Dumps of Marki-  
Mangali(MM-III) Opencast Coal mine of M/s B.S.Ispat Ltd.  
PO : Mukutban, Dist :Yavatmal

Referred by: M/s B.S. Ispat Ltd.

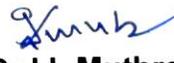
Period of Investigation : May 2021- September 2021

Investigators :

Dr. Rajendra Yerpude, Coordinator  
Dr. I.L.Muthreja, Coordinator  
Dr. Ajay Kumar Agarawal, Co-coordinator  
Dr. Ritesh Lokhande, Co-coordinator



Dr. Rajendra Yerpude  
Coordinator



Dr I L Muthreja  
Head of the Dept.



Dr Ms Madhuri Chaudhari  
Dean(R&C)

Dept. of Mining Engineering  
Visvesvaraya National Institute of Technology  
Nagpur



**विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान**  
**VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR**  
**Format for Consultancy Application**

1.	Name of the Department	<b>Department of Mining Engineering</b>
2.	Proposal for Consultancy Work	<b>Scientific Slope Stability Study of benches and dumps of Marki Mangali-III OC Coal Mine, M/s BS Ispat Ltd, Mukutban Dist Yavatmal</b>
3.	Name of the Party	Mine Manager MM-III, Mukutban Dist Yavatmal BS ISPAT LTD,
4.	Type of Consultancy	<b>Stability Analysis of pit slope, dumps and design</b>
5.	Name/s of Coordinator/s	Dr R R Yerpude, Dr I L Muthreja
	Names of Co-coordinators	Dr R D Lokhande Dr A K Agarwal
6.	Consultancy Charges Proposed	
	(a) No. of Man-hours involved	60*8=480 man-Hrs
	i) Coordinators	480 Hrs*Rs 500/- = <b>Rs 2,40,000/-</b>
	ii) Other Faculty Members	
	iii) Other Departmental Staff	20 x 8 (Rs.250)= <b>Rs40,000/-</b>
	(b) No. of Visits	
	i) Faculty Members	20*2000/-= <b>Rs40000/-</b>
	ii) Others	
	(c) Collection-Testing of samples (NABL Approved Lab) <i>Geo-Tech Lab</i>	<b>Rs 1,00,000/-</b>
	(c) Approximate TA/DA for site visit, Cost of consumables and other charges, instrumentation etc, if any, required to be borne :	<b>Rs 50,000/-</b>
	(d) GST @ 18%	Rs 4,70,000/-*18%= <b>Rs 84600/-</b>
7.	Total Cost of Consultancy	Rs 4,70,000/- + GSTRs <b>84600/-= Rs 5,54,600/-</b>
8.	Period in which the work is likely to be completed	3-4 months / based on availability of data

*[Signature]*  
 (Dr R R Yerpude) 3/11/20  
 Coordinator

*[Signature]*  
 (Dr I L Muthreja)  
 Coordinator & Head of Department

*[Signature]*  
 (Dr R D Lokhande) 3/11/20  
 Co-coordinator (1)

*[Signature]*  
 (Dr A K Agarwal) 3/11/2020  
 Co-coordinator (2)

*[Signature]*  
 Dean (R&C)

Approved / Not Approved  
**Director**

Copy to: Dy.Registrar (Accts.)



विश्वेश्वरय्या राष्ट्रीय प्रौद्योगिकी संस्थान  
VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY, NAGPUR  
Format for Consultancy Application

Ref: MNG/E-02/21/

Date: June 24, 2021

1.	Name of the Department	Department of Mining Engineering		
2.	Proposal for Consultancy Work	Scientific study to investigate the subsidence impact on surface, support design and suggest the suitable safe method of complete extraction by caving method in W 1 panel of Chattarpur Mine of Pathakhera Area WCL		
3.	Name of the Party	Sub-Area Manager, Chattarpur Sub Area, Patherkhera Area, WCL		
4.	Type of Consultancy	To investigate the subsidence and strata control management		
5.	Name/s of Coordinator/s	1. Prof. R R Yerpude	2. Dr. R D Lokhande	
	Names of Co-coordinators	Dr. I L Muthereja	Dr. A K Agarwal	Dr. A Kher
6.	Consultancy Charges Proposed			
	(a) No. of Man-hours involved	180*4=720 Hrs		
	i) Coordinators	720 Hrs*Rs 500/- = Rs 360,000/-		
	ii) Other Faculty Members			
	iii) Other Departmental Staff	20 x 8 *(Rs.250) = Rs 40,000/-		
	(b) No. of Visits			
	i) Faculty Members	16*2000/- = Rs 32000/-		
	ii) Others			
	(c) Approximate DA for site visit, Cost of consumables/testing and other charges, instrumentation etc, if any, required to be borne :	Rs 75,000/-		
	(d) Service Charges (GST) @ 18% of (a), (b) and (c)	Rs 507000/-*18%= Rs 91260/-		
7.	Total Cost of Consultancy	Rs 507000/- + GSTRs 91260/-= Rs 598260/-		
8.	Period in which the work is likely to be completed	3 months		

*[Signature]*  
Prof. R R Yerpude  
Coordinator (1)

*[Signature]*  
Dr. R D Lokhande  
Coordinator (2)

*[Signature]*  
Dr. I L Muthereja  
Co-coordinator

*[Signature]*  
A K Agarwal  
Co-coordinator

*[Signature]*  
A Kher  
Co-coordinator

*[Signature]*  
Dr. I L Muthereja  
Head of Department

*[Signature]*  
Dean (R&C)

Approved / Not Approved

Director

