

Sethi Heavy Engineering's
Photographic Representation of
Manufacture & Supply
[INCLUDING VTL / VMC MACHINING, GEAR CUTTING, SERATION GENERATION & DYNAMIC BALANCING.]
of Turning Gear for the ship
M.V. Orissa

[88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.]



CLIENT: M/s. Sesa Goa Ltd., Goa.



Ship Managing Agent : Accord Ship Mgt. Pvt. Ltd., Mumbai

Inspecting Authority : Indian Register of Shipping

Agreed delivery time 30 days - Delivery effected in 22 days.

TIMELY SUPPLY HAS BEEN OUR FORTE



For Breakdown / Maintenance Jobs / Spares Call us now : 022- 26840734 / 26823173 Fax: 26820853

SETHI HEAVY ENGINEERING

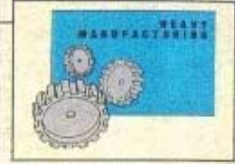
Redefining Engineering

Off: 603, FLYOVER APARTMENTS, END OF FLYOVER, TELLI GALLI, ANDHERI-EAST, MUMBAI-400 069. Tel:- 022- 26840734 / 26823173 Fax: 26820853.

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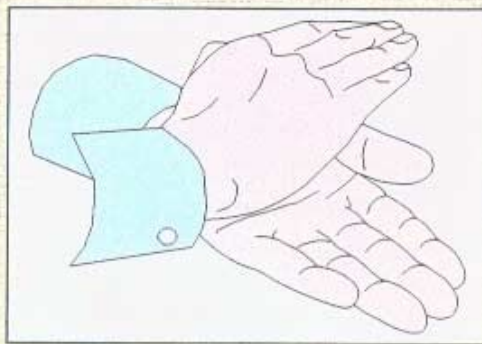
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



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of Turning Gear for the ship
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ACKNOWLEDGEMENTS



CLIENT : **M/s SESA GOA LTD, (GOA)**

INSPECTION AGENCY: **INDIAN REGISTER OF SHIPPING (I.R.S.)**

Acknowledgements



It is often said that “Great men do not do different things but do things differently.”

We, at Sethi Heavy Engineering have one motto in line with the above which reads :

“What ever need be done, must be done well.” – We have lived each day with this philosophy in our pursuit towards excellence in the *Engineering Industry*.

When we undertook the **Herculean Task** of **timely completion of manufacturing the Turning Gear for your vessel M.V. Orissa**, we had besides our **technical backup and our recourses** – The **“Will to succeed”** and the **“Moral responsibility to live up to our commitments.”**

We have, at our end tried our level best to give you a quality product to the best of Engineering standards. It is our sincere hope and belief that we, did live up to the confidence reposed by the **“Sesa Goa Family”** in us now and you have our word that we will live up to it in the future as well.

Nothing in life is an individual effort and so has it been with this project too – We are indeed grateful to the Executives of **M/s. Sesa Goa who have pooled all resources to help expedite decisions at all levels and for their continued guidance, help, support & encouragement .**

Our most grateful thanks to :

1. **Mr. Amit Pradhan – Director (Services)** (in Alphabetical order)
2. **Mr. Hubert F. Pereira**
3. **Mr. K. Venketeswaran – Sr. Manager (Projects)**
4. **Mr. R. R. Naik – Sr. Manager (Purchase)**
5. **Mr. Rakesh Chittal**
6. **Mr. Satish Thayapurath – Manager (Fleet – Maintenance)**

For **considering us for such a critical and time bound complex job.**

Our sincere thanks are due to **M/s. Accord Ship Management Pvt. Ltd.,** Mumbai for the confidence reposed in us and for their continued valued help and support. Special mention need be made of the following :

1. **Mr. Akshay K. Srivastava** (in Alphabetical order)
2. **Mr. U.K. De – General Manager**

For their unqualified support, guidance, help, patience & round-the-clock availability – be it day or night.

Contd ... 2

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Acknowledgements



Our Grateful thanks are due to **M/s. Indian Register of Shipping**, Mumbai, Pune & Goa for accommodating us at such short notice, appreciating our constraints and arranging for inspections, re-scheduling inspections due to delays in schedules on account of power constraints and marginal revision in requirements.

The following have been of great help and we would like to record their names below with extending our warm thanks to them once again.

1. Mr. A. S. Sapre
 2. Mr. D.M. Jadhav
 3. Mr. G.L. Saldanha – Principal Surveyor , Pune
 4. Mr. N. Hariharan - Principal Surveyor , Goa
 5. Capt. N.M. Padhi
 6. Mr.R. Purkayastha – Senior Principal Surveyor, Mumbai
 7. Mr. S. Kumar – Chief Surveyor, Mumbai
 8. Mr. S. K. Kulkarni
 9. Mr. Ulhas S. Kalghatgi – Senior Surveyor, Mumbai
 10. Mr.V.G. Deshpande – Senior Surveyor, Mumbai
- (in Alphabetical order)

Lastly, a special mention to the **cohesiveness, patience and untiring effort of our team** at **Sethi Heavy Engineering & our associates** – for strength and success stems only from unity of thought and action.

Please find enclosed herewith a *graphic representation of your job reconstructed step by step for your perusal and record.*

We look forward to being of service to you in future.

Signed, Sealed and Delivered with heart within and God overhead.

Thanking you,
For Sethi Heavy Engineering,

Mr. P. C. Sethi
Executive Director.

Dated : 21.07.2004.

Our Seal of Quality

SETHI HEAVY ENGINEERING

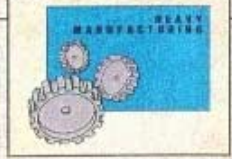
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



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ANALYSIS OF BROKEN TURNING GEAR



CLIENT : **M/s SESA GOA LTD, (GOA)**

INSPECTION AGENCY: **INDIAN REGISTER OF SHIPPING (I.R.S.)**

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



BROKEN SEGMENTS OF THE ORIGINAL TURNING GEAR AS RECEIVED AT MUMBAI .

Executives of M/s Sethi Heavy Engineering had earlier visited the vessel at Goa Port for a Prelim study of the Job.



ONE OF THE LARGE SEGMENTS OF GEAR IDENTIFIED HAVING INTACT TEETH PROFILE.

The module as well as exact number of teeth of the Turning Gear as well as O.D. were ascertained by backward integration

PINION OF TURNING GEAR

Since exact center to center distance of the Gear and Pinion set could not be ascertained at site, relative meshing seen to identify co-relation of Pitch Circle Diameter with details mentioned.



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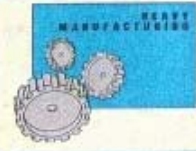
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M/s SETHI HEAVY ENGINEERING'S TECHNICAL TEAM OF EXPERTS DISCUSSING ASPECTS OF GEAR AFTER RECONSTRUCTION OF BROKEN PIECES.



BROKEN SEGMENTS OF THE ORIGINAL TURNING GEAR BEING RECONSTRUCTED BY PLACING THEM ON A TEMPLATE HAVING O.D. & ROOT DIA MARKED.

The Original Turning Gear had sustained heavy damage.



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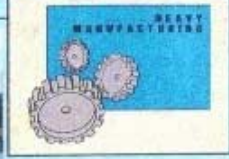
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



COMPLETION OF
RE-CONSTRUCTION
OF BROKEN
SEGMENTS OF
TURNING GEAR.

Few pieces do not fit
as probably some
pieces may not have
been fully recovered.
Pinion seems intact.



Mr. U.K.DE (G.M.)
OF M/S ACCORD
SHIP MANAGEMENT
PVT. LTD .looks on
and captures the
images of the
reconstructed
segments of the
TURNING GEAR.



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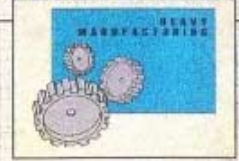
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MATERIAL TESTING
AND ULTRASONIC TESTING



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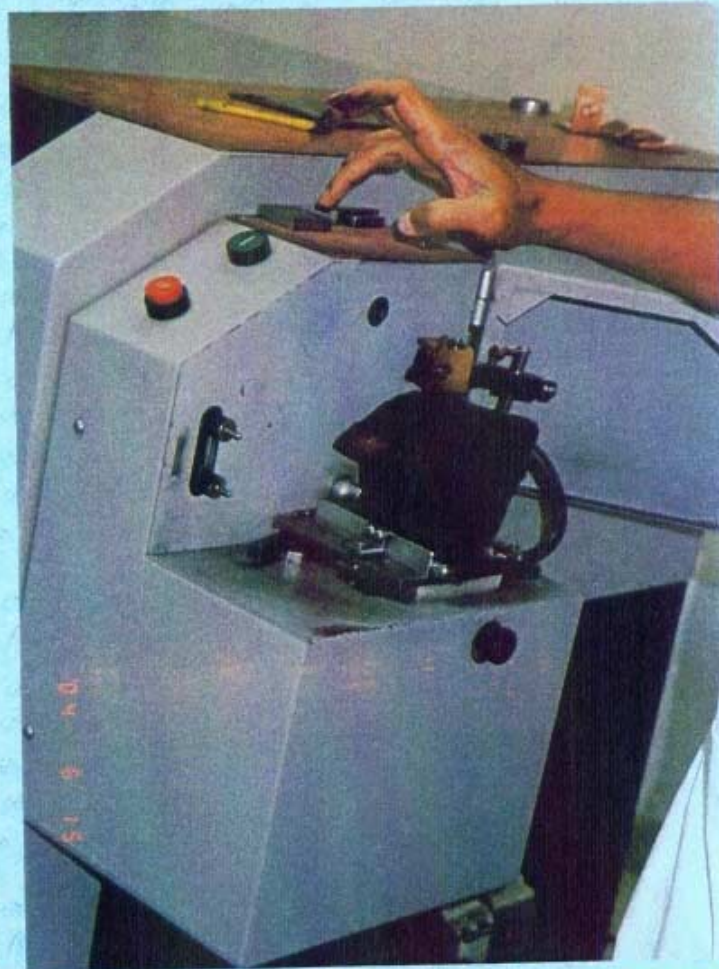
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



BROKEN TOOTH OF ORIGINAL TURNING GEAR polished and prepared for testing on a SPECTROGRAPH machine to check its constituent elements.



BROKEN TOOTH OF ORIGINAL TURNING GEAR being tested on a SPECTROGRAPH machine . ANALYSIS IS FULLY AUTOMATIC .



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



I.R.S INSPECTOR LOOKS AT THE COPY OF ORIGINAL MILL TEST CERTIFICATE TO VERIFY PLATE AND HEAT NUMBER..

ASTM A 516 GR 70
Plate 130 mm thick
and full length being
tested Ultrasonically
at the steel yard by
Representative of
Indian Register of
Shipping Inspector
in presence of M/s
Sethi Heavy Engg.
Representative.

100 % SCANNING OF PLATE
BEING DONE meeting
ASTM A 578 LEVEL II
Standard of Testing.



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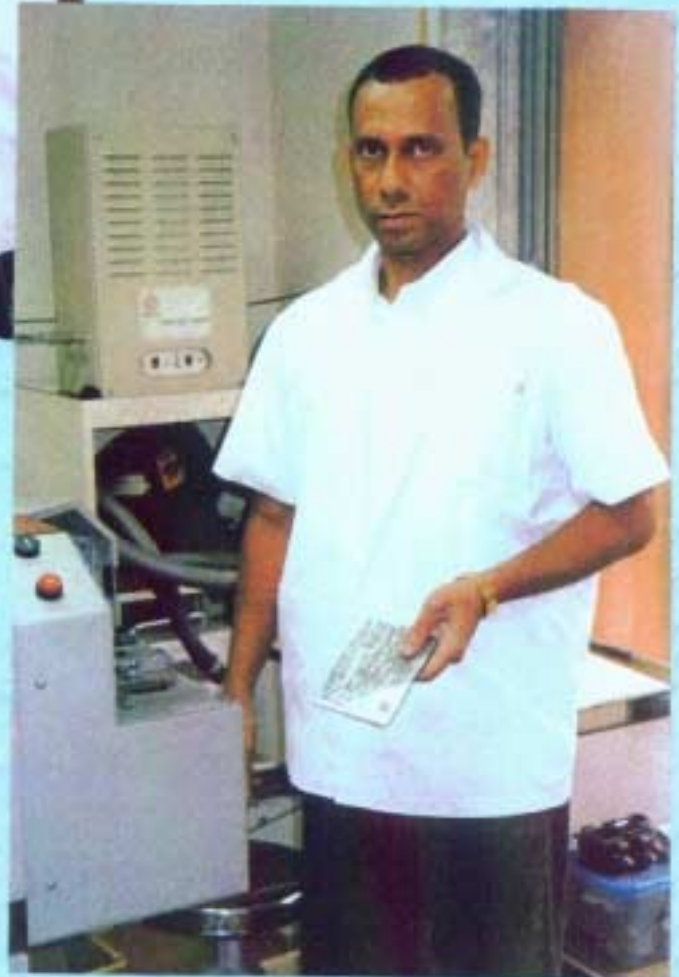
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



SLICE OF ASTM A 516 GR 70 PLATE cut , polished and prepared for testing on a SPECTROGRAPH machine to verify its conformance..



ASTM A 516 GR 70 PLATE having burn mark after SPECTROGRAPH IS COMPLETED.

Analysis is complete and conformance printed report submitted



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GEAR BLANK MACHINING ON VTL & IRS INSPECTION



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



IMPORTED CRAVEN VERTICAL TURRET LATHE[V.T.L.] being used for machining gear blank. High speed and feed cut being taken seeing urgency of Job.



FULL MACHINING OF ONE FACE AND BORE OF GEAR BLANK COMPLETED.

T.I.R. reading OF BORE [using dial gauge] found within 20 microns.



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SETHI HEAVY ENGINEERING

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



DIMENSIONS AND TOLERANCES BEING CHECKED BY I.R.S INSPECTOR in presence of M/s SETHI HEAVY ENGG. INSPECTOR.

T.I.R. readings as under:

BORE within 20 microns
O.D within 20microns
FACE within 15 microns



DIMENSIONS AND TOLERANCES BEING CHECKED BY I.R.S INSPECTOR .

T.I.R. reading OF BORE, O.D., FACE being taken [using dial gauge].

Present during Inspection Executive Director of M/s SETHI HEAVY ENGG (towards extreme right in photo)



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



DIMENSIONS AND TOLERANCES BY I.R.S INSPECTOR (extreme left)

Present during Inspection INSPECTOR of M/s SETHI HEAVY ENGG (extreme right in photo) INSPECTOR'S STAMP TRANSFERRED ON OTHER SIDE AFTER ONE SIDE MACHINING.



FULLY MACHINED BLANK HAVING COATING OF GOLDEN ANTI-RUST APPLIED.

UNLOADED FROM MACHINE AND READY FOR FURTHER PROCESSING.



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



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DRILLING OF PILOT HOLES ON CNC
CO-ORDINATE DRILLING MACHINE



CLIENT : M/s SESA GOA LTD, (GOA)

INSPECTION AGENCY: INDIAN REGISTER OF SHIPPING (I.R.S.)

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



**CNC CO-ORDINATE
DRILLING MACHINE**

**SPECIAL PURPOSE
FULLY COMPUTERISED
NUMERICALLY
CONTROLLED
CO-ORDINATE DRILLING
MACHINE**

Being use d to generate the
pilot bores(holes) for the
fitted and free bolting holes
of the Turning Gear.

Spindle Speeds of this
S.P.M. exceed 8000 rpm.



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



**SPECIAL PURPOSE
FULLY COMPUTERISED
NUMERICALLY CONTROLLED
CO-ORDINATE DRILLING MACHINE**

Special Four flute drills with forced
coolant being used.
(as seen in both photos)

Spindle Speeds of this S.P.M.
exceed 8000 rpm.

Surface finish exceeds that
obtained by reaming. Co-ordinate
accuracy upto 3 decimal places.



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GENERATION OF ALL
HOLES ON CNC VMC



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



SPECIAL PURPOSE FULLY COMPUTERISED VERTICAL MACHINING CENTRE.[V.M.C.]

Being used to enlarge the holes for the
fitted and free bolting holes of the
Turning Gear.

Spindle Speeds of this S.P.M. exceed
3600 rpm

Please see the tooling head having
automatic change turret as per tool
selection.

JOB IS IN PROCESS AND CLAMPED
ON TABLE



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



MACHINING OF BORE AT HIGH SPEED.

Kindly note the shine in the bore which shows that the surface finish is as good as ground finish.

Special Purpose tooling used to cope up with the high speeds and feeds involved.



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



MR. U.K.DE(G.M.) OF
M/s ACCORD SHIP
MANAGEMENT
PVT LTD.
UNDERSTANDING
THE VARIOUS
COMPLEXITIES of
the tooling used in
the V.M.C.



MR. U.K.DE(G.M.) OF
M/s ACCORD SHIP
MANAGEMENT
PVT LTD.
Capturing the
progress of the Job
using his Digital
Camera.

Please note that job
machining is in
progress on the
V.M.C.



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GEAR CUTTING, SERRATION
GENERATION AND INSPECTION



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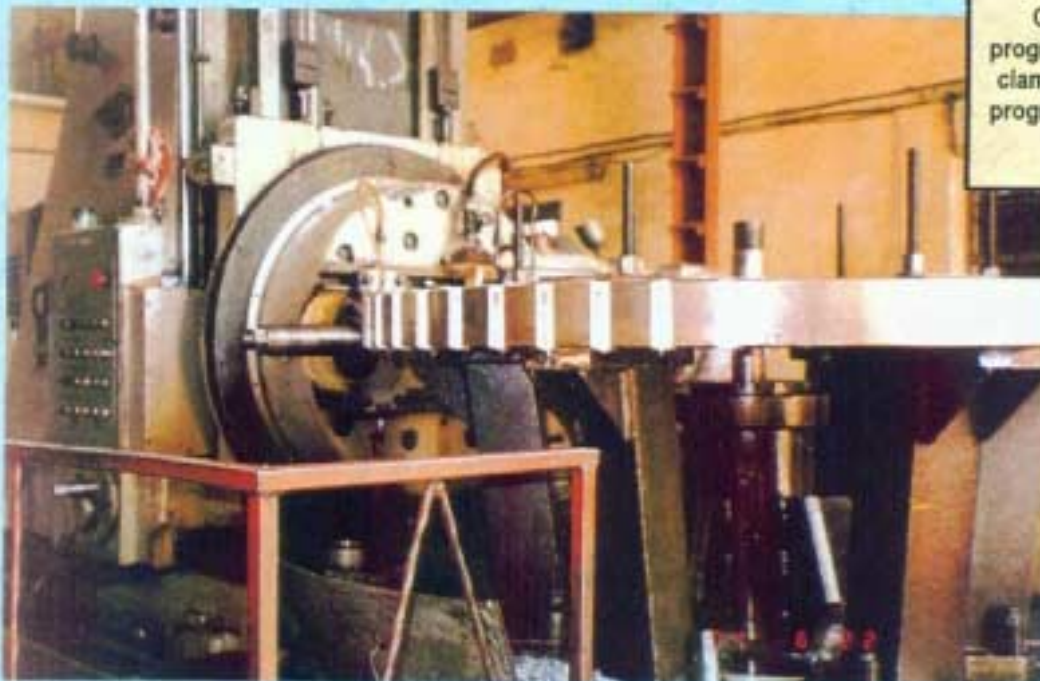
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SPECIAL PURPOSE
GEAR CUTTING
MACHINE WITH
ROTARY INDEXING
HEAD AND ROTARY
INDEXING TABLE FOR
ANGULAR ARBOUR
CUTTING.

Gear Cutting is in
progress. Job is securely
clamped on the table as
progressive teeth cutting
goes on.



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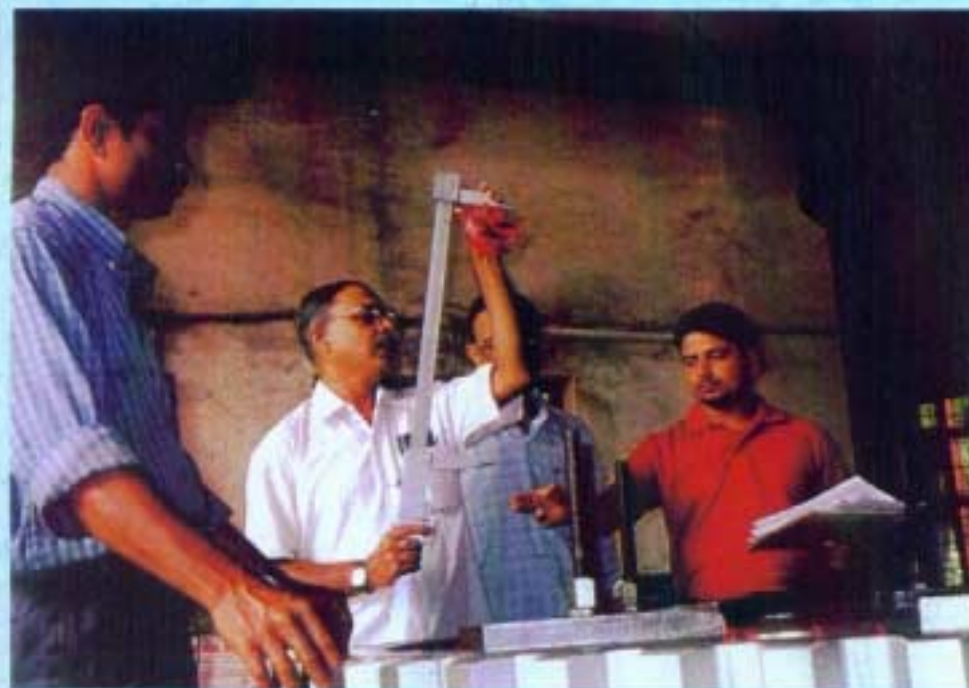
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Members of M/S SETHI HEAVY ENGG'S ASSOCIATE TEAM with Shri K. Venkateswaran of M/s. SESA GOA LTD (as seen in middle)

Shri K. Venkateswaran (Sr. Mgr. Projects) had visited the Gear Cutting facility to witness Gear Cutting and he seems more than happy with the progress of the Job.



INDIAN REGISTER OF SHIPPING'S PUNE OFFICE INSPECTOR (in the red T-Shirt) seen checking the various parameters of the Gear viz M.O.T. , tooth thickness, O.D. of the GEAR , Root Diameter & all the bolting hole diameters also etc.

Also seen in the photo alongside are M/s SETHI HEAVY ENGG'S Inspector (Holding the Vernier as well as the gentleman behind him)



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

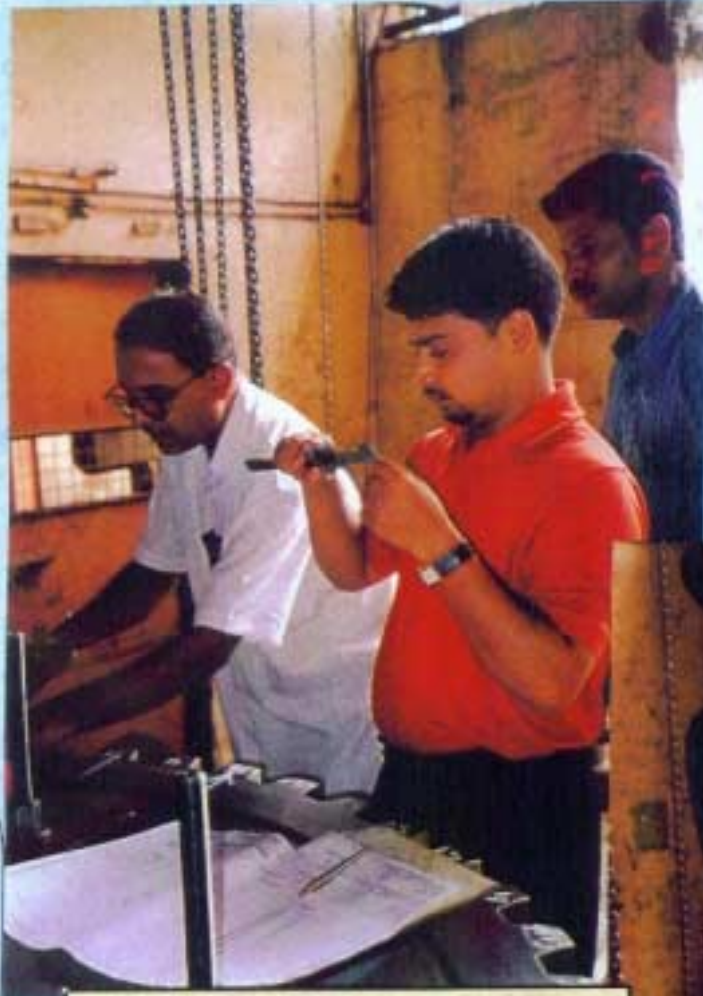
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INSPECTION AGENCY: INDIAN REGISTER OF SHIPPING (I.R.S.)

SETHI HEAVY ENGINEERING

603, FLYOVER APARTMENTS, END OF FLYOVER, TELLI GALLI, ANDHERI-EAST, MUMBAI-400 069. Tel:- 022- 26848734 / 26823173 Fax: 26828853.

Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



INDIAN REGISTER OF SHIPPING'S PUNE
OFFICE INSPECTOR
(in the red T-Shirt)
seen checking the various parameters of the
Gear viz M.O.T.

Please see the excellent surface finish as well
as the 360 degree serrations generated on the
Gear Face marked clearly .

(M./s SETHI HEAVY ENGG approved drg
submitted earlier to I.R.S can be seen alongside)

(Indexing accuracy of the machine is within 5
seconds.)



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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



Photographic Representation of
Manufacture & Supply
[INCLUDING VTL / VMC MACHINING, GEAR CUTTING, SERRATION GENERATION & DYNAMIC BALANCING.]
of Turning Gear for the ship
M.V. Orissa

RE-MACHINING ON VTL,
DYNAMIC BALANCING, FINAL IRS INSPECTION
RE-GENERATION OF SERRATIONS,
PACKING & DESPATCH



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ONE OF THE LARGEST VERTICAL TURRET LATHES(V.T.L) IN PUNE IN THE PVT SECTOR VIZ. 4 M seen having a special ring of INDIAN SPACE AND RESEARCH ORGANISATION [ISRO] being machined.

Due to revisions in job thickness parameters, RE-MACHINING of the TURNING GEAR needed to be done.

Seeing the urgency of the Job and with a view to save transportation time, a very special request was made by M/s SETHI HEAVY ENGG'S Executive Director to the company to stop ISRO's Job and accommodate our Job on the machine.

Due to the good offices shared with M/s Sethi Heavy Engg our job was accommodated.

PLEASE NOTE THAT THE TOOLPOST RAM IS ANGLED TO MACHINE THE ISRO JOB. Complete setting of the Machine had to be changed and Tool Post made vertical to accommodate our Job.



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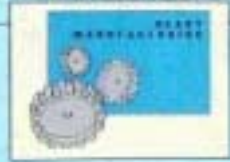
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



ISRO RING - PARTIALLY MACHINED AS SEEN IN THE PHOTO.

FURTHER MACHINING OF THIS JOB WAS STOPPED TO ACCOMMODATE OUR TURNING GEAR.

GEAR IS BEING LOADED ON THE VTL TABLE INSIDE THE DIA OF THE ISRO JOB SPECIALLY AS SEEN.



TURNING GEAR BEING MACHINED USING DOUBLE TOOL POST RAM.

PLEASE NOTE THAT BOTH THE RAMS VIZ. TOOLS POSTS HAVE BEEN MADE VERTICAL TO MACHINE OUR JOB.

PARTIALLY MACHINED ISRO JOB IN BACKGROUND.



(88,000 DWT Vessel) – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

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SETHI HEAVY ENGINEERING

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



FULLY RE-MACHINED
GEAR LOADED ON
DYNAMIC BALANCING
MACHINE.

Turning gear has been
balanced to one of the
most stringent standards
of I.S. viz. 2.5 G.

(Please note that special
holding and mounting
fixture was made with
OD Ground shaft as per
bore of Gear.)



PRINCIPAL
SURVEYOR OF
I.R.S. Pune
OFFICE [SEEN ON
THE EXTREME
LEFT.] discussing
with Inspector of
M/s Sethi Heavy
Engg.

Also seen in the
background are
Mr. U.K.DE (G.M.)
of
M/s ACCORD
SHIP
MANAGEMENT
PVT and Executive
Director of
M/s SETHI HEAVY
ENGG.



(88,000 DWT Vessel) – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

CLIENT : **M/s SESA GOA LTD, (GOA)**

INSPECTION AGENCY: **INDIAN REGISTER OF SHIPPING (I.R.S.)**

SETHI HEAVY ENGINEERING

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



FINAL THICKNESS
OF THE
RE-MACHINED
FACE OF THE
TURNING GEAR
BEING CHECKED BY
IRS PRINCIPAL
SURVEYOR



FULLY
DYNAMICALLY
BALANCED JOB
ROTATING AT
375 RPM
BEING SHOWN BY
Executive Director of
M/s Sethi Heavy
Engg to the Principal
Surveyor of M/s IRS.



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

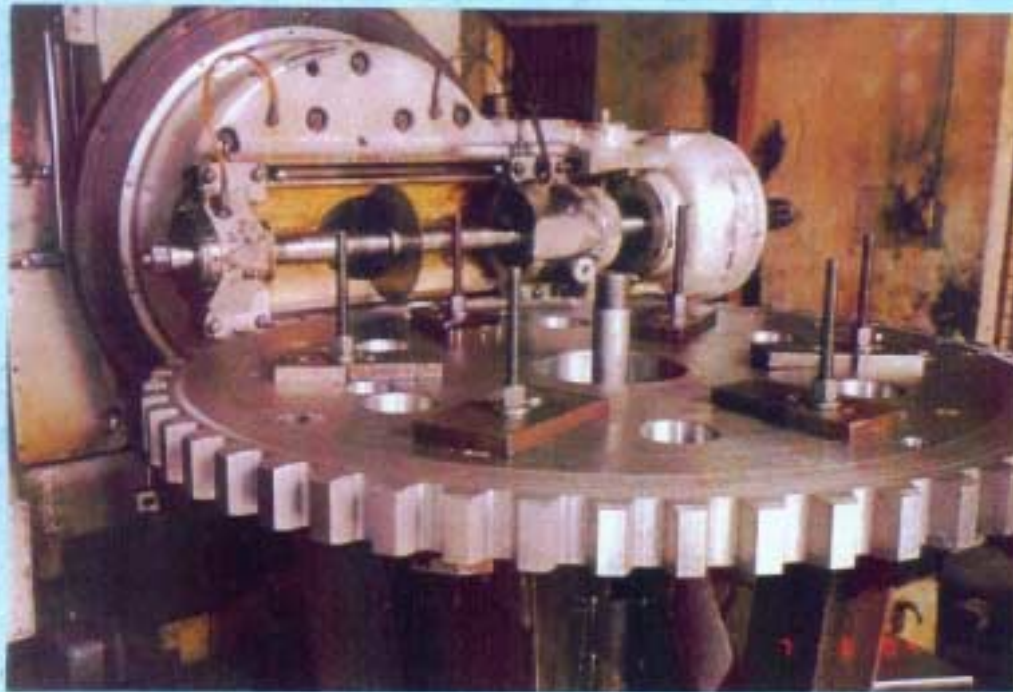
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



RE-GENERATION OF 360 DEGREE MARKINGS being done once again after re-machining on machine.

Please view the slitting cutter mounted specially.

Job involves accurate rotary indexing and a high degrees of time per slot.



Mr. U.K. DE (G.M.) of M/s ACCORD SHIP MANAGEMENT PVT LTD viewing the Re-Generated Markings over the periphery of the Turning Gear.



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

CLIENT : M/s SESA GOA LTD, (GOA)

INSPECTION AGENCY: INDIAN REGISTER OF SHIPPING (I.R.S.)

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



SERRATIONS
BEING
RE-GENERATED
by SLITTING
CUTTER AS
SEEN IN PHOTO.



CLOSE UP OF
TURNING GEAR WITH
SERRATIONS AND
FULLY MACHINED
HOLES.

PLEASE SEEN THE
SHINE IN THE BORES
OF THE HOLES
SHOWING THE
SUPERB SURFACE
FINISH. Also one can
see the GEAR TEETH
AND THE ORIGINAL
IRS STAMPING ON
THE PLATE
[circled in white]

ALSO SEEN ARE THE
5 DRILLED HOLES VIZ.
MATERIAL REMOVAL
FOR DYNAMIC
BALANCING.



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

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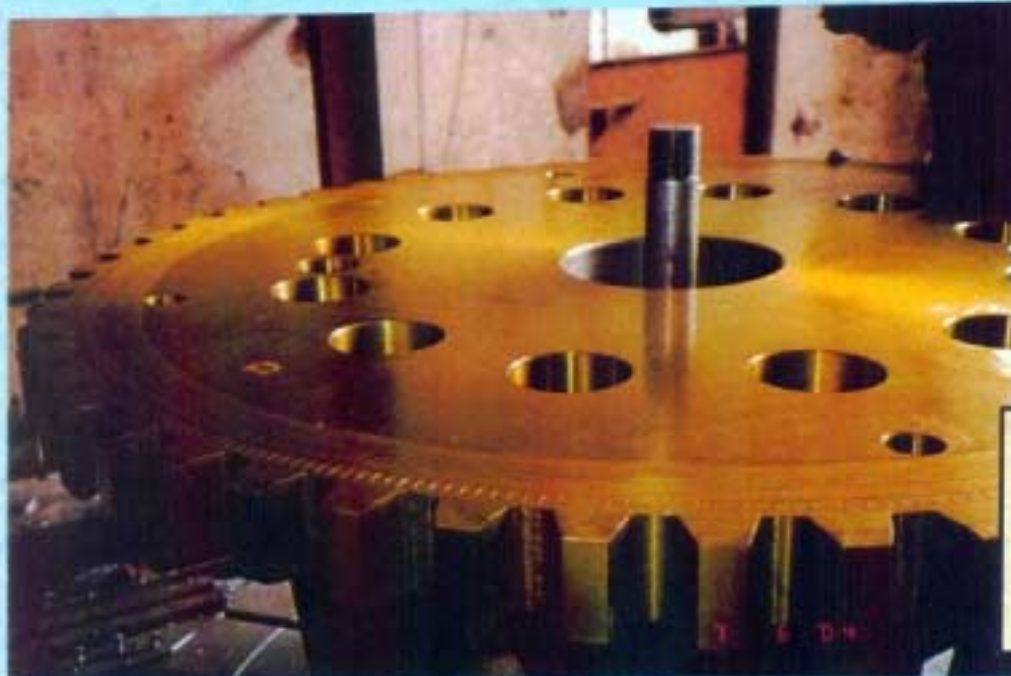
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



CLOSE UP OF
TURNING GEAR WITH
SERRATIONS AND
FULLY MACHINED
HOLES.

Also one can see the
GEAR TEETH AND
THE ORIGINAL IRS
STAMPING ON THE
PLATE
[circled in white]



TURNING GEAR
FULLY MACHINED -AS
SEEN WITH ONE COAT
ON GOLDEN
ANTI-RUST



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



TURNING GEAR
BEING HOISTED AND
LIFTED OFF THE
GEAR CUTTING
MACHINE.



TURNING GEAR
FULLY MACHINED -AS
SEEN WITH ONE COAT
ON GOLDEN
ANTI-RUST BEING
SPECIALLY PACKED.
EACH BORE HAS
3 MM RUBBER SHEET
ALONG WITH
EXPANDABLE PIPE
INSERT TO ENSURE
NO IN-TRANSIT
DAMAGE



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



FULLY PACKED
TURNING GEAR AS
SEEN - COMPLETELY
COVERED WITH
RUBBER AND
COTTON BELTING
ALL OVER TO
ENSURE FULL
PROTECTION AND
PREVENT IN-TRANSIT
DAMAGE OF ANY
KIND.



FULLY PACKED
TURNING GEAR AS
SEEN - DULY
SECURED AND
LOADED IN THE
SPECIAL TEMPO
READY FOR
DESPATCH.



(188,000 DWT Vessel - Bulk Carrier - Engine Power 14,931 KW - 20,000 H.P.)

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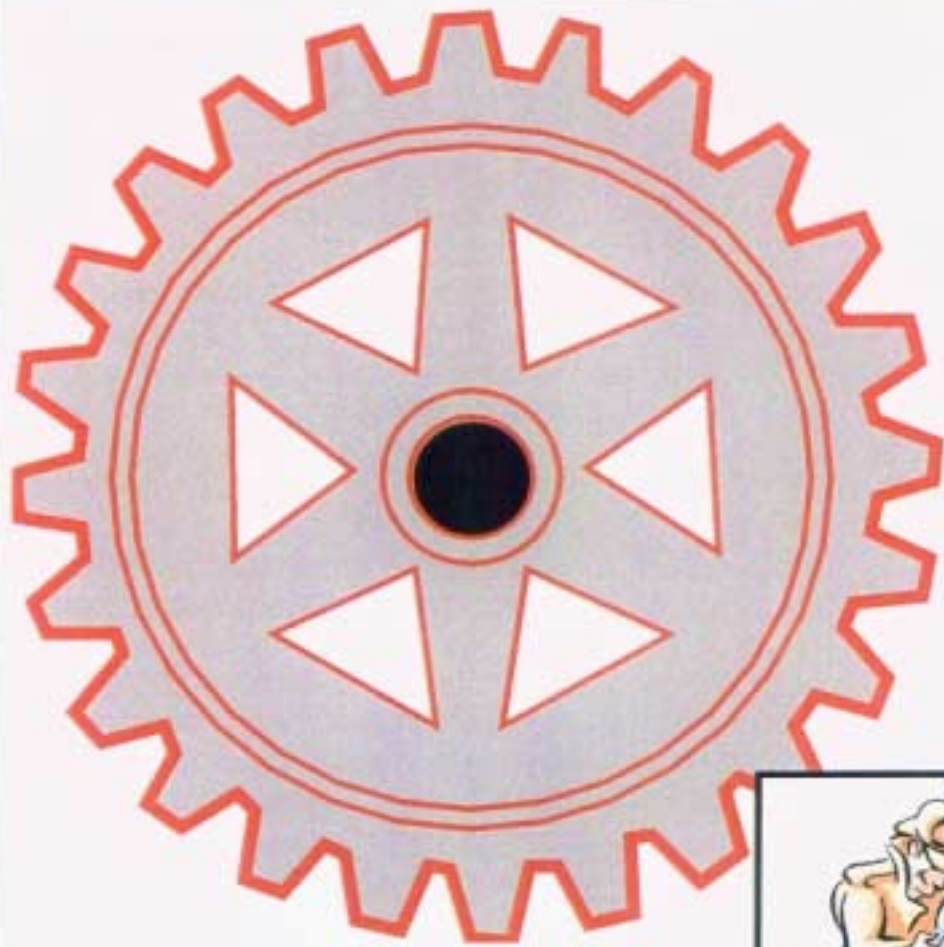
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Manufacture & Supply of Turning Gear for the Ship M.V. Orissa



INSPECTION REPORT



188,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P. 1

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Inspection Report for Turning Gear for the Ship M.V. Orissa



All Readings Checked by I.R.S. Inspectors

| Sr. | Dimension/ Parameter Measured | AGREED ACCURACIES | ACHIEVED ACCURACIES |
|-----|---|-------------------|---------------------|
| 1. | Outside diameter | 200 microns | 5 microns |
| 2. | Inside diameter | 200 microns | 50 microns |
| 3. | Face depth | 200 microns | 40 microns |
| 4. | Face T.I.R. (Out of flatness) | 50 microns | 15 microns |
| 5. | Outside diameter T.I.R. | 50 microns | 20 microns |
| 6. | Inside diameter T.I.R. | 50 microns | 20 microns |
| 7. | P.C.D. of holes | 300 microns | 40 microns |
| 8. | 132 mm hole diameter | 200 microns | 10 microns |
| 9. | 135 mm hole diameter | 200 microns | 10 microns |
| 10. | Lifting holes | 500 microns | 40 microns |
| 11. | Gear Span Measurement | 500 microns | 70 microns |
| 12. | Dynamic unbalance allowed as per Gr 2.5 | 220 Gms. | 100 Gms. |

Like we said earlier, " Anything that is worth doing is worth doing well"

It is always desirable to promise less but give better accuracies as will be amply seen from above.

Our Seal of Quality



(88,000 DWT Vessel – Bulk Carrier - Engine Power 14,931 KW – 20,000 H.P.)

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Facilities at our disposal as under

Heavy Fabrication Rolling and X-Ray Quality Welding (Lifting over 450 Tons)

PLATE MATERIAL: IS 2062 / IS 2002 GR B / BQ ASTM A 515 / 516 GR 60/70
STAINLESS STEEL SS 304 / 316 / 316L
HARDOX 400 / 450 / 500 / 600 & SAILHARD / TISCRA
PLATE BENDING : UPTO 120MM THICKNESS COLD & UPTO 200 MM HOT
PLATE CUTTING : UPTO 200 MM CNC GAS CUTTING / PLASMA CUTTING
WELDING: CO2 / ARGON / MMAC / SAW- 800M TYPE / TIG / MIG
STRESS RELIEVING FURNACE : 8M X 8M X 18M

FORGED & MACHINED SHAFTS

FORGED SHAFTS: MATERIALS EN 8 / EN 9 / EN 19 / EN 24 / EN 31
/ EN 40B / EN 353 ETC / C45 / 20 MN CR 5 / 42 CR MO4 V
STAINLESS STEEL SHAFTING: SS 304 / SS 310 / SS 316/L / SS 431
DIAMETERS: ROLLED : 60MM TO 180 MM X LENGTHS UPTO 5METRES
FORGED : 180 MM TO 1100 MM X LENGTHS UPTO 6METRES.
TURNING: 2000MM X UPTO 10 000 MM (LATHES)
HORIZONTAL BORING: 210MM SKODA / 160 MM TOS
VTL : FROM 1000MM TO 7000 MM

CENTRE TO CENTRE GRINDING ON 6 METRES MACHINE Diameters: 1000 mm x 6000 mm lengths

GEARS/ PINIONS: Forged / Cast & Fabricated Internal & External

SPUR / HELICAL / HERRINGBONE / BEVEL / SPIRAL BEVEL
HOBBED GEARS UPTO : 40 MODULE
FLAME HARDENED & THROUGH HARDENED

OUR STRENGTH

- ✓ A VISION TO DELIVER VALUE
- ✓ ENGINEERING EXCELLENCE WITH GLOBAL COMPETITIVENESS
- ✓ A PASSION TO EXCELL

WE STAND COMMITTED TO : Quality Workmanship Reliability & Timely Deliveries

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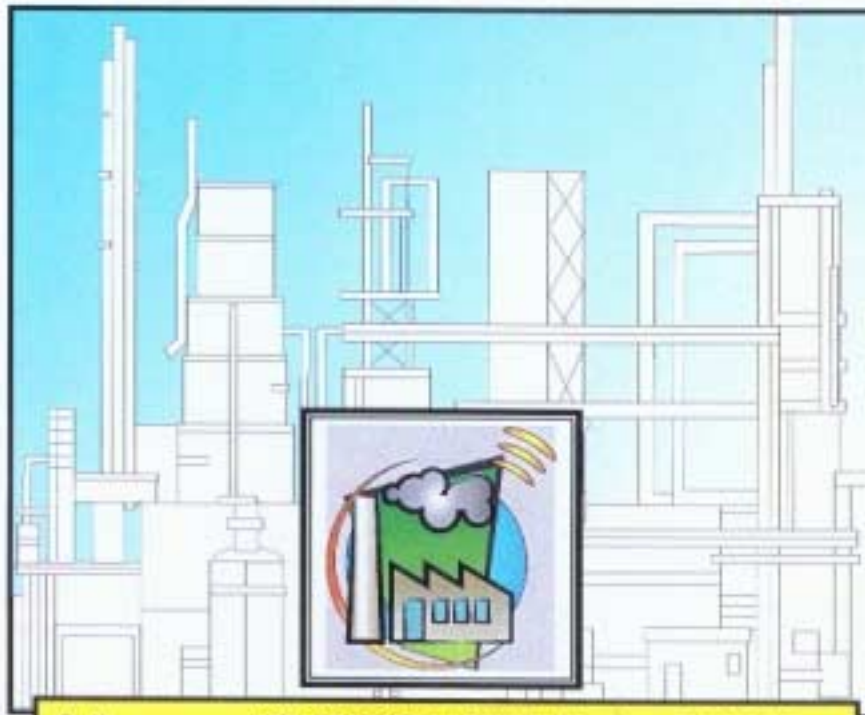
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