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पॉवर सेक्टर - पश्चिमी क्षेत्र की गृह पत्रिका

स्पन्दन  
SPANDAN

Special Issue  
**STRAND JACK SYSTEM**

अप्रैल-2011

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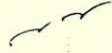
**Message from the ED, PSWR**



It is a matter of great pleasure in releasing this special issue of SPANDAN on Strand Jack System for boiler drum lifting. We are proud that PSWR took the initiative to acquire Strand Jack System. It has been a long vision to acquire this facility as the projects were continuously facing problem and delays in the drum lifting activity because of limited resources of Strand Jack System.

In short span of 4 months, we have successfully lifted 5 boiler drums viz 2x500 MW NTPC Mauda, 2x500 MW NTPC Vindhyachal, 2x270 MW Satpura, 2x270 MW GVK Goindwal (PSNR) and 5x250 MW India Bull Nashik using our own strand jack. The entire operation was carried out by trusted & dedicated team from the region itself. I am hopeful that this endeavor will ensure that drum lifting activity by Strand Jack System is not a bottle neck in future in PSWR.

I extend my best wishes to the team & region for many such futuristic initiatives.

  
**Anil Aurangabadkar**  
ED, PSWR



# BOILER DRUM LIFTING USING STRAND JACK SYSTEM

## Introduction



A strand jack is a hollow hydraulic cylinder with a set of steel ropes (the "strands" in the name) passing through the open centre, each one passing through two clamps - one mounted to either end of the cylinder. The jack operates in the manner of a caterpillar's walk: climbing (or descending) along the strands by releasing the clamp at one end, expanding the cylinder, clamping there, releasing the trailing end, contracting, and clamping the trailing end before starting over again.

At BHEL site, strand jack system is in-vogue for the boiler drum lifting and gradually being deployed for lifting of generator stator of late. Earlier electrically operated winches were used for drum lifting with very extensive rigging arrangement.

## Background

In view of monopoly reigned by limited resources in India in the field of providing the services of strand jack system especially for boiler drum lifting, generator stator, and

BHEL's compulsions to ensure timely achievement of the milestones, Power Sector Western Region took the initiative and procured 1 set of strand jack system from U.K based firm M/s Dorman Long Technology. Commissioning & operation of strand jack system for erection of 1<sup>st</sup> & 2<sup>nd</sup> drum was done under the supervision of O.E.M experts, the 3<sup>rd</sup>, 4<sup>th</sup> & 5<sup>th</sup> erection was done independently by FEX team. During the process, the support was extended to the GVK Goindwal site, a PSNR project which has been appreciated.



**BHARAT HEAVY ELECTRICALS LIMITED**  
POWER SECTOR NORTHERN REGION  
BHEL Site office, GVK Thermal Power Plant,  
GOINDWAL SAHIB, DISTT. TARNTARAN, PIN CODE 143422, PUNJAB

Ref: BHEL/PSNR/GVK/GWL/ADMGVK/007/32 14/03/2011

To  
The Executive Director  
BHEL PS-WR  
Shree Mohini Complex  
345 Kingsway (Nagpur)



Dear Sir,

We would like to express our sincere appreciation and gratitude for excellent team work and co-ordination shown by BHEL-PSWR -FEX team comprising of Sh. Abu Basher Guaffani, Sh Shivdass Singh, Sh. Jai Prakash and Sh. S.C.Verma during the Boiler Drum lifting and alignment of Unit-I (2x270MW) at GVK Goindwal

We greatly value the commitment, hard work which they have performed and hope that the team will rise to such occasion in future also.

With Kind Regards

Your Sincerely

(Arun Singhal)

General Manager (PS-NR)  
GVK- Goindwal Sahib Site



Date: 15<sup>th</sup> March'11

To,  
The Executive Director,  
M/s BHEL (PSWR)  
Shree Mohini Complex  
345 Kingsway  
Nagpur- Maharashtra

Kind Attention: Sh. Aurlanga Badkar

Dear Sir,

We would like to express our sincere appreciation and gratitude for excellent team work and coordination shown by M/s BHEL (PSWR)-FEX Team comprising of Sh. Abu Basher, Sh. Shivdass Singh, Sh. Jai Prakash & Sh. S C Verma has demonstrated outstanding effort and cooperation with site staff to complete GVK Power (Goindwal Sahib) Limited Unit-I (2X270 MW) Boiler Drum lifting and its alignment.

M/s GVK Power (Goindwal sahib) greatly values and appreciates the commitment, hard work and overall team work they have performed.

Best Wishes

For

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## Advantages of Strand Jack System over Electric Operated Winch method

Strand Jack System method of drum lifting scores over Electric Operated Winch method on the following counts:

- Failsafe system mainly due to use of multiple strands versus solitary steel wire rope and the provision of fall arrestors system through use of conical shaped grips.

- Less preparatory works and execution time
- Relatively precise, synchronized and smooth lifting facilitates easy alignment and reduction in stress on personnel



### Basic Requirements

**By BHEL site personnel:** to ensure completion of all preparatory works specially positively involving hot works prior to commencement of strand jack system until de-mobilization of strand jack system from boiler area, take ownership of overall drum lifting process and allocate clear co-ordination responsibilities among the concerned personnel. (Photograph named Hot work damages)

**By Strand Jack System O&M team:** ensuring timely transportation of strand jack system through sites, enough safe guard of the strand jack system equipment, smooth O&M of strand jack system and most importantly creating complete clarity on roles of each agencies as per the laid down procedure.

**By E & C agency:** timely deployment of adequately skilled riggers and dedicated supervisors on sustained basis right up to strand jack system de-mobilization



### Procedure

Broadly the drum lifting procedure consists of following:

- Erection of Cat head beam
- STOP ALL HOT WORKS IN BOILER
- Laying of Gratings for strand preparation
- Shifting of strand jack system at Boiler top
- Erection of Jacks, strand guide on cat head beam,



positioning of power packs in line of both the cat head beams, erection of temporary shed with table & bench



- Tightening of Strands & load test
- Boiler Drum lifting & Transferring of load on "U" bolts



- Erection of derrick
- Electrical connection from main power source to bus bar at top of boiler, bus bar to TPN box, TPN Box to Power Packs
- Commissioning of strand jack system (Connecting of Hoses & control Box)
- Inspection, cleaning/replacing of grips of Fixed Anchor Block
- Insertion of Strands into the Jacks and template



- Alignment of Drum
- De-commissioning of strand jack system
- Remove all strand jack system items away from Boiler cavity
- Give clearance for Hot Works

- Fastening of Fixed anchor block correctly into Boiler drum lifting lugs

**Compliance of the procedure and requirements of manpower/resources, the complete activity takes approximately 05 (five) days.**

### Achievements

It goes entirely to the credit of PSWR that the FEX team lifted boiler drum at Mauda after brief initial demonstration and then under supervision of DLT expert, at Vindhyachal just in the presence of DLT expert and at Satpura, Goindwal (PSNR) and at Nashik independently.

Last but not the least, this achievement would not have been possible but for dedicated efforts of members S/Shri Jai Prakash, S. C Verma, Rajesh Kumar Singh and Shivdas Singh under the leadership of Mr. M. A Ghaffari.

