तेल उद्योग सुरक्षा निदेशालय
Oil Industry Safety Directorate
ISO 9001:2015 certified

सुरक्षा संवाद
Suraksha Samwad

An opportunity to learn from mistakes....

Disclaimer

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VP & Head ISBL1

Chemical Engineer with 33 years Commissioning and Operation experience comprising large scale Petrochemical and Refinery Units and major Revamping Projects.

Focus Areas: Operational Excellence, Process Safety Management, Asset Reliability and Competency Mapping.

Commissioning and Operation of: Hydrogen Units, Hydroprocessing Units, Visbreaker & Treaters

- Operations of: FCCU, CDU, DCU, NHT/CCR & SRU
- Project Execution of Refinery Expansion Units, VGOMHC, NHT/CCR Revamping

Education and Professional Certification:B.E (Chemical) with major in Petrochemical Technology , M S University of Baroda,Post Diploma in Industrial Safety, Gujarat Safety Council

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Presentation on LTI Injury Incident

Crude Oil Tankages (COT) during M & I

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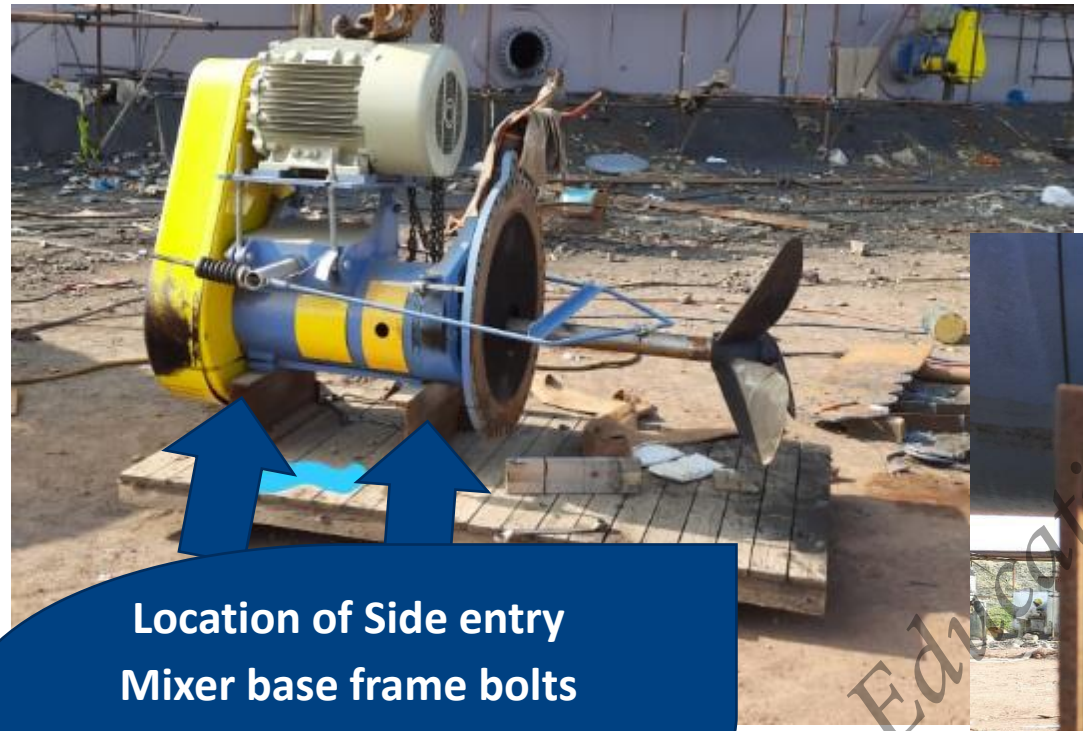
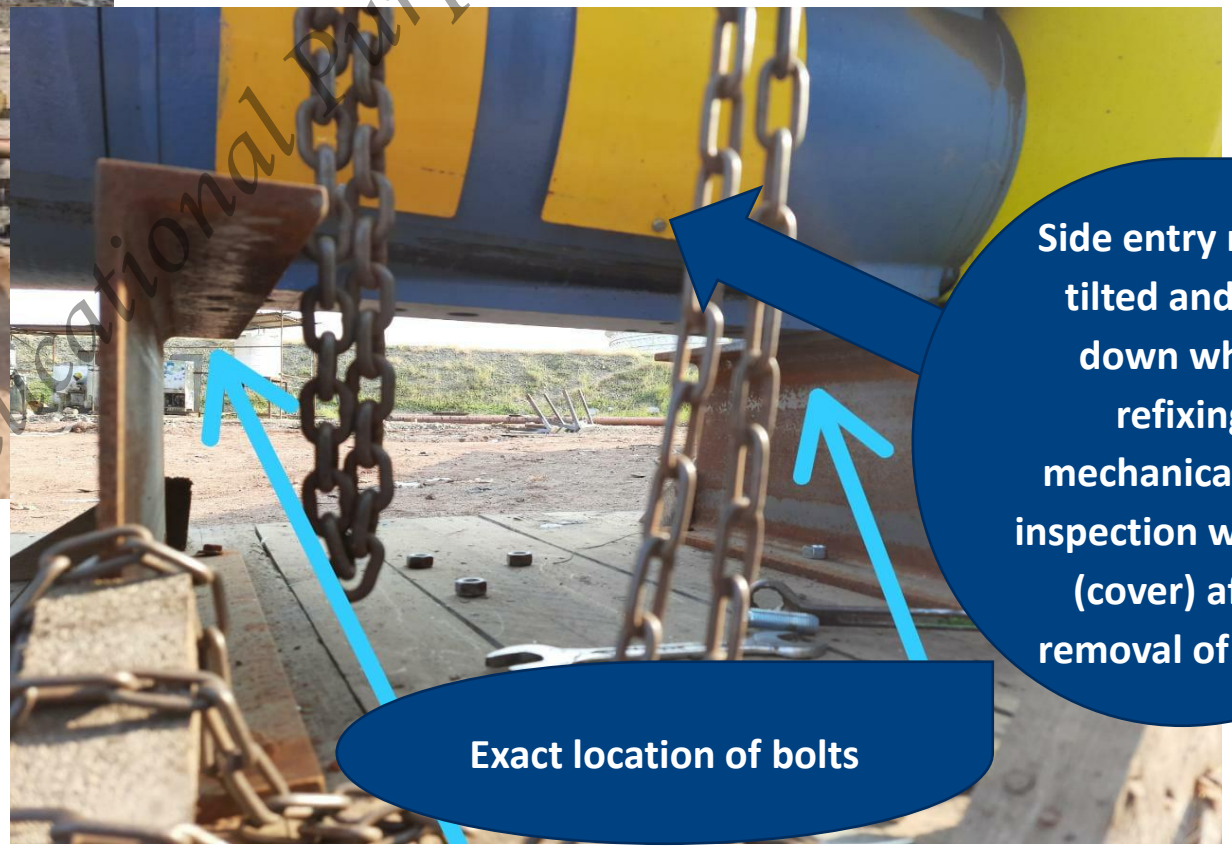
Incident Location



Location of Side entry Mixer base frame bolts from packing support channels



Side entry mixer tilted and fell down while refixing mechanical seal inspection window (cover) after removal of bolts

Exact location of bolts

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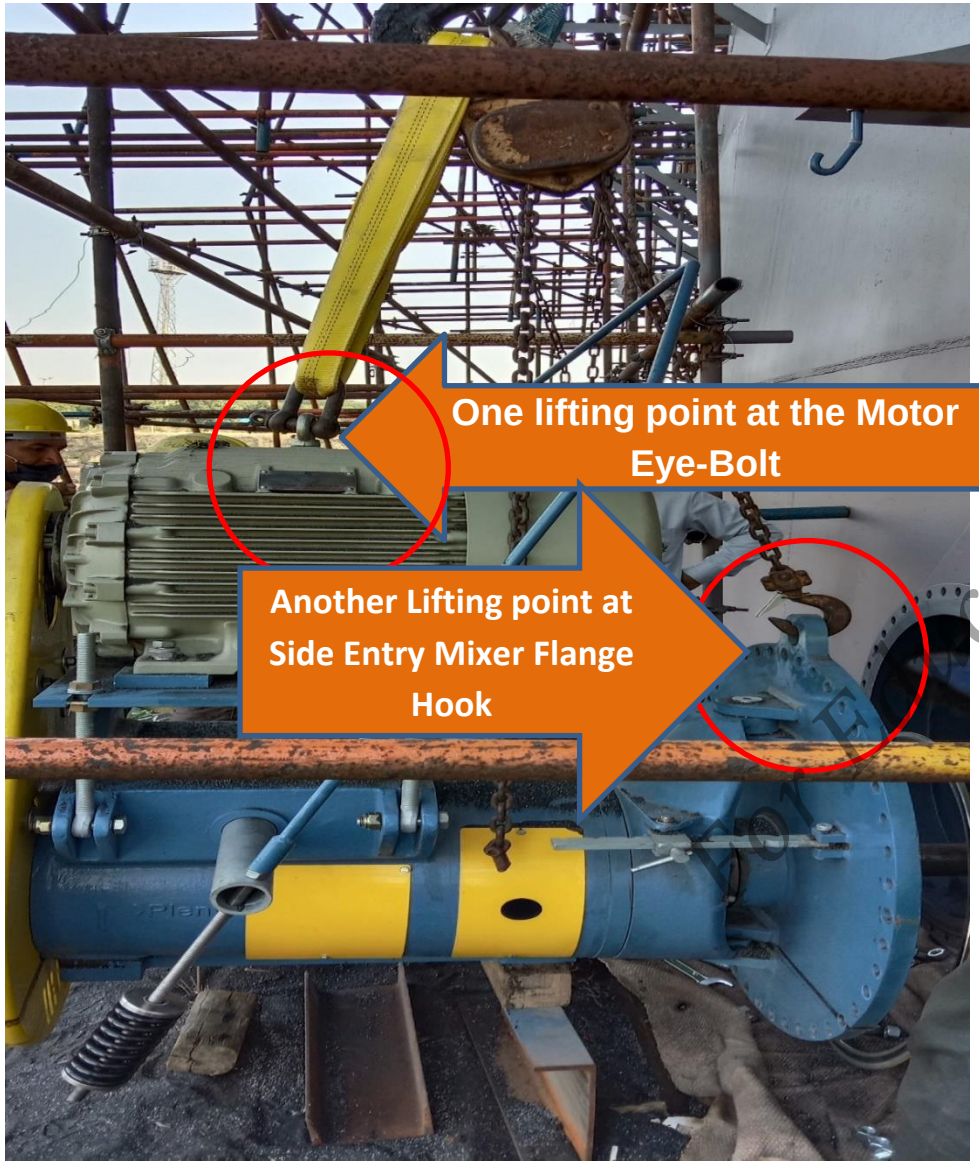
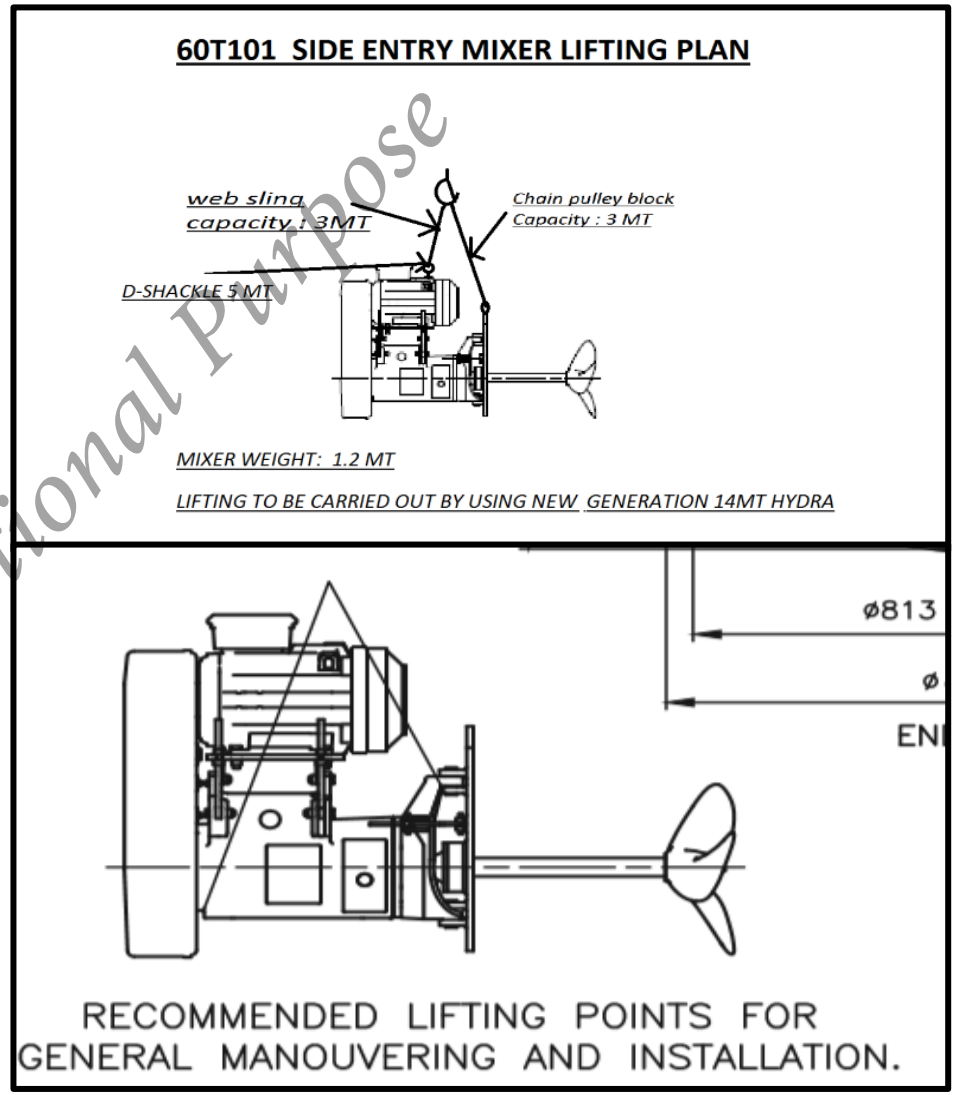
Lifting Methodology Followed





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Lifting Plan Executed for erection and installation of side entry mixer by Mechanical Department

Lifting Plan provided by OEM

Incident Description

- Crude Tank 60T-101 was handed over to Mechanical Maintenance by Operations for Maintenance & Inspection (M&I). As a part of M&I activity, it was planned to install side entry mixer in the tank. Shifting of 1st side entry mixer was done from store office (at dyke) to the designated location at dyke by hydra & trailer truck. Subsequently, 2nd and 3rd side entry mixers were also shifted and were installed as per plan.

- On 25th Oct, 2020 (at 15:00 Hrs.), unboxing of 4th side entry mixer was started by (Injured person-Rigger) from the wooden pellet packing support channels. The mixer was fixed to the metal channel with 4 nos. of Bolts and metal channels bolted with wooden pellet. The side entry mixer mechanical seal inspection window (cover) was opened to remove the metal channel bolts. After removing the bolts and re-fixing the mechanical seal inspection window (cover), the side entry mixer assembly got imbalanced, tilted and fell down on the rigger(injured person and he got trapped between side entry mixer hanging rod and mixer body which leads to fracture in Spine and Lower Limb.

- At job site, another two riggers and one hydra operator were present. They rescued the rigger and later he was shifted to Hospital.

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Root Cause Analysis

At Risk Condition

Description	Comments
1. Improper Handling and Lifting. **2. Sub-Standard Surface**	1. Side entry mixer was not secured before removing mixer base frame bolts from packing support channels. 2. The nearby location was found uneven, area grading was not done properly. 3. Packing support channels fixed to the wooden pellet were found loosened and found shaking.

At Risk Behaviour

Description	Comments
1. Failure to secure/make safe. **2. Improper Handling and Lifting.** **3. Working without authority.**	1. Opening of side entry mixer base frame bolts from packing support channels without securing it with hydra. 2. Job was started without the presence of supervisor.

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Root Cause Analysis

Personal factor

Description	Comments
Lack of Skill	1. The injured person was new to side entry mixer installation job for this particular tank. 2. Hydra Operator was having 2 years' experience.
Lack of Knowledge	**Task Training / Instructions:** 1. Inadequate training on the rigging task carried out. 2. Clear instructions were not given and safe work practice was not communicated to the injured person.

Job factor

Description	Comments
1. Inadequate Supervision **2. Co-ordination among the working team**	1. Job was started without the presence of supervisor. 2. Dedicated supervisor for the job was not available at the job location.
1. Inadequate Standards / Procedures	**Competency Assessment:** 1. Inadequate practice for carrying out the competency assessment systematically. **Systematic Work Practices:** 1. Safe Work Practice is being communicated verbally in the form of Tool Box Talks. It was not communicated on the basis of Work Method Statement/lifting plan. 2. Lifting plan prepared was inadequate.

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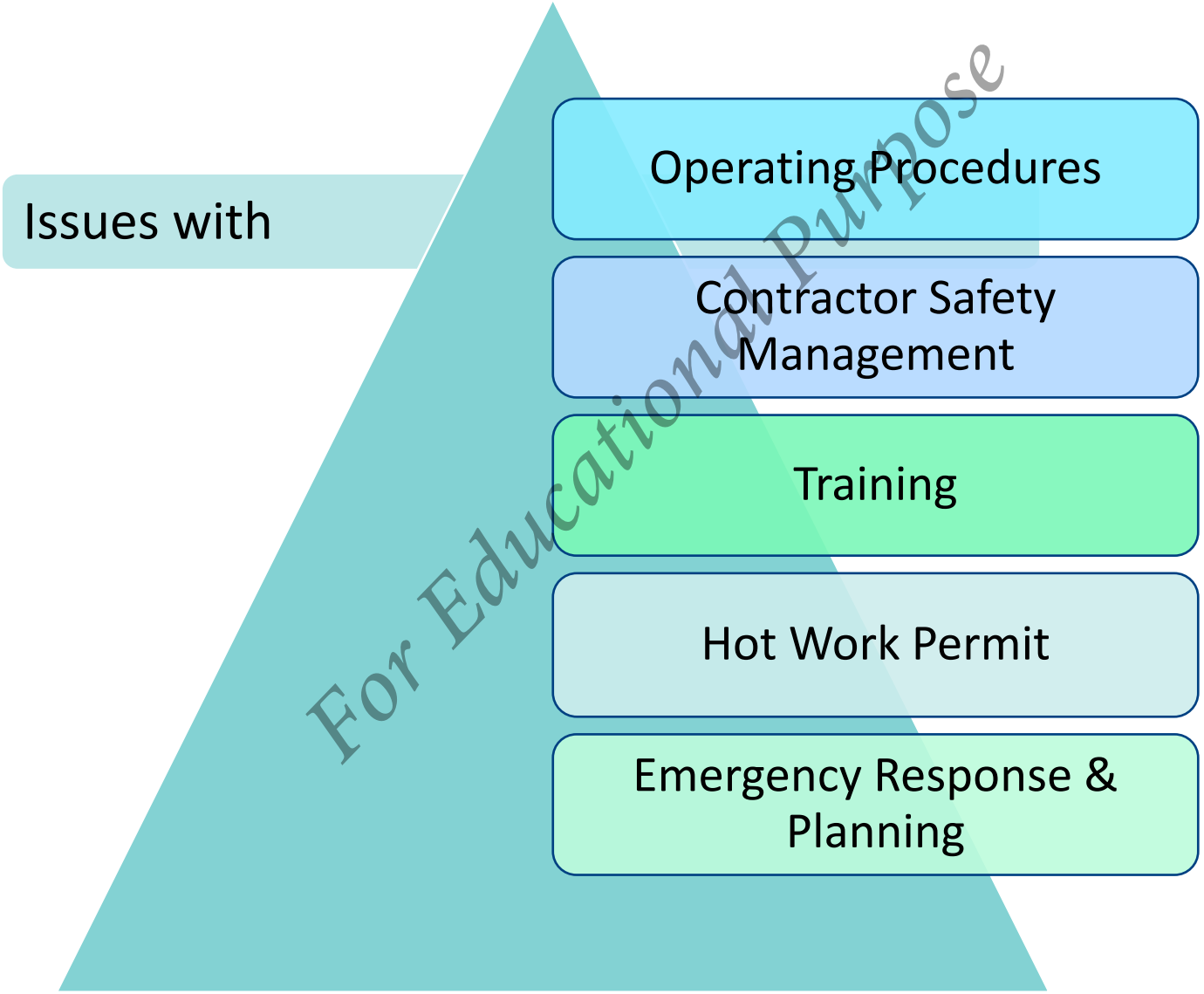
Process Safety Management Elements involved



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Recommendations

S/No.	Corrective Action
1	Mechanical department shall submit Job planning list for tank M&I activities to operations dept. Operations department shall review TBRA of all critical jobs, non-routine and specialized jobs.
2	For Tank M&I critical jobs, non-routine and specialized jobs, requirement of job specific work permits shall be reviewed as per job planning.
3	CCTV monitoring should be considered for all Tank M&I jobs.
4	All tank M&I jobs and project jobs shall be prioritized for continuous supervision and intermittent supervision based on its criticality (By Company as well as Contractor).
5	OEM recommended lifting plan or approved lifting plan shall be implemented for equipment erection jobs.

S/No	Preventive Action
1	Format should be developed for Work Method Statement. 1. Detailed work method statement format should be prepared for execution of critical lifting activities involving weight of more than 1 Tonne. This shall include essential details like personnel involved, work supervisor, Tools/materials required (resource arrangements, essential equipment required, description of activity with executing procedure in steps etc. 2. Short work method statement format should be prepared for all lifting activities involving weight of less than 1 Tonne.
2	Maintenance department shall also identify the list of other critical non-routine activities which require Standard Maintenance Procedure(SMP). These activities shall be listed out in the concerned department's SMP.
3	The training calendar should be circulated every month separately for all identified trades as per training matrix for contractor personnel through training center. System should be developed for monitoring training compliance and records keeping. This should be linked with existing gate pass system for training compliance.

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Recommendations

S/No	Preventive Action
4	Minimum Required Competency should be identified for critical trades, which should also include years of experience, technical, safety and behavioral part. System should be established for retaining skilled & experienced personnel for critical trades.
5	Minimum Required Competency with qualification, years of experience etc. shall be defined in all the work orders being processed for Contractors.
6	External third party trade validation-competency assessment should be carried out for all critical trades in Refinery.
7	Deviations from SMP or OEM recommendations shall be addressed through authorized approval. This shall be included in department procedure. (Ex: Concession Deviation).

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NAYARA ENERGY

Thanks

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