



Add value.
Inspire trust.

Experience with Remote HAZOP

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Summary

- Focus on remote HAZOP sessions within TÜV SÜD Chemie Service GmbH
- Since April 2020 more than 400 remote HAZOP session days conducted
→ >90% in Germany, remainder in US
- Conferencing Tools:
Cisco Webex,
Microsoft Teams,
GotoMeeting, etc.
based on customer preferences



Lessons learned

- Transmission / performance of the internet and connections more stable than expected
- No big differences in the performance and functionality of the conferencing tools
- Virtual document sharing and redmarking of P&IDs can be managed
- Scheduling is more flexible
- Ad-hoc session for short project reviews / MOC possible
- Effectiveness seems to be higher*
- Reduced non-verbal interaction of facilitator and team**
- Significant time & cost saver for the facilitators due to reduced travel time

* based on gut feeling and first rough data. May require deeper quality assessment

** If a team member is too shy and does not speak up, potentially we're missing important contributions. Countermeasure encourage the participants to use the private chat with the facilitator



Outlook

- Digitalization and virtuality will change our way of HAZOP facilitation
- Remote HAZOP facilitation provides more flexibility in scheduling
- Increased productivity of facilitators due to reduced travel time => reduced facilitator resources to provide scope of service
- Location of subject matter expert is not of interest
- Augmented reality and virtual site walkaround will replace prior HAZOP site inspections

Virtual teams and spaces



HAZOP+ = HAZOP + OPEX4.0

➤ HAZOP is the established analysis method in Process Safety for safety reviews. Risk reduction measures are identified.

➤ HAZOP is a deep analysis of the process

➔ In **HAZOP+** this in-depth analysis is systematically used also for **the optimization** of the plant.



➤ OPEX (Operational Excellence) serves the optimization of cost parameters, such as yield, utility usage, on-stream-time.

➤ Today, the optimization is most effective with data based methods / AI. In reference to the term 'Industry 4.0' → **OPEX 4.0**

➔ **HAZOP+** combines a HAZOP study with an OPEX4.0 project, while systematically utilizing **synergies** between the two



Synergies between OPEX4.0 and HAZOP

- **Efficient preparation of data & documents**

- Significant overlap → saves time and effort

- **HAZOP quality:**

Making use of the operating data analysis from the optimization project

- ‘Unfavorable’ operating periods and plant upsets can result safety incidents

- **Operational Optimization with minimized risk, through using safe limits from the HAZOP study, and certification of the project ves relevant guidance through TÜV SÜD**

- Limits for the optimization safe, but not overly conservative
 - Certified project flow according German engineering guideline VDI 3714

- **Online ‘Readiness Assessments’ support preparation**

