



Chemie Service

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HAZOP+ Process Safety and Operational Excellence

Recognise Risks Early – Improve Safety – Increase Operational Excellence

Safety, integrity and economic efficiency are crucial for the operation of production facilities. This requires a **comprehensive understanding** of the hazards, risks and technological processes in **current and also future** operations.

In this context, increasing digitalisation and Industry 4.0 allow **continuous, data-based and automated** investigation and optimisation using **AI-based methods** of processes of all kinds. This opens up new potentials for HAZOP studies and Operational Excellence (OPEX).

However, HAZOP and OPEX are often considered and treated separately in companies. In doing so, the enormous **synergy potential** that results from linking **HAZOP and AI-based operational excellence studies** remains hidden and completely unused. For example, aspects of the technological production processes are always considered in the safety assessment but are not pursued further outside the safety assessment. Conversely, Operational Excellence always processes data that is relevant for safety analyses but is not processed further for this purpose. Synergised data utilisation and analysis can save time, effort and costs and **increase plant safety and operational excellence** simultaneously in an efficient and effective manner.

The **HAZOP** method is a systematic method for identifying hazards and evaluating countermeasures. A systematic investigation process is used to look for possible hazard scenarios in a technical system or process and develop targeted countermeasures to increase the safety of systems, improve operability and ultimately also optimise service life and plant availability.

Operational Excellence/OPEX focuses on increasing productivity, reducing costs and improving (product) quality.

(Infra-)structures, technologies, processes and behaviours are aligned along value chains to create a learning, continuously improving organisation.



Why HAZOP+?

With **HAZOP+**, TÜV SÜD, in cooperation with atlan-tec Systems, offers a new extended, **synergetic approach** to process safety, which uses state-of-the-art methods of data analysis in safety and risk analysis and additionally includes a data-based operational excellence investigation, taking into account safety and environmental aspects, regulatory requirements as well as applicable guidelines and standards.

Your benefit

Together with our partner atlan-tec Systems, we offer a modular, cost-efficient programme that allows an

individual focus on all relevant topics of plant safety and operational excellence. Our approach is based on the Industrie 4.0 maturity model of the acatech study, Schuh et al. 2017, the SIRI maturity index, as well as the VDI guideline VDI3714 **“Implementation and operation of Big Data applications in the manufacturing industry; implementation of Big Data projects”**.

As a result, HAZOP+ shows a legally compliant path to continuous, automated process optimisation in your plants with improved economic performance (OPEX 4.0) and simultaneously increased plant safety and integrity.

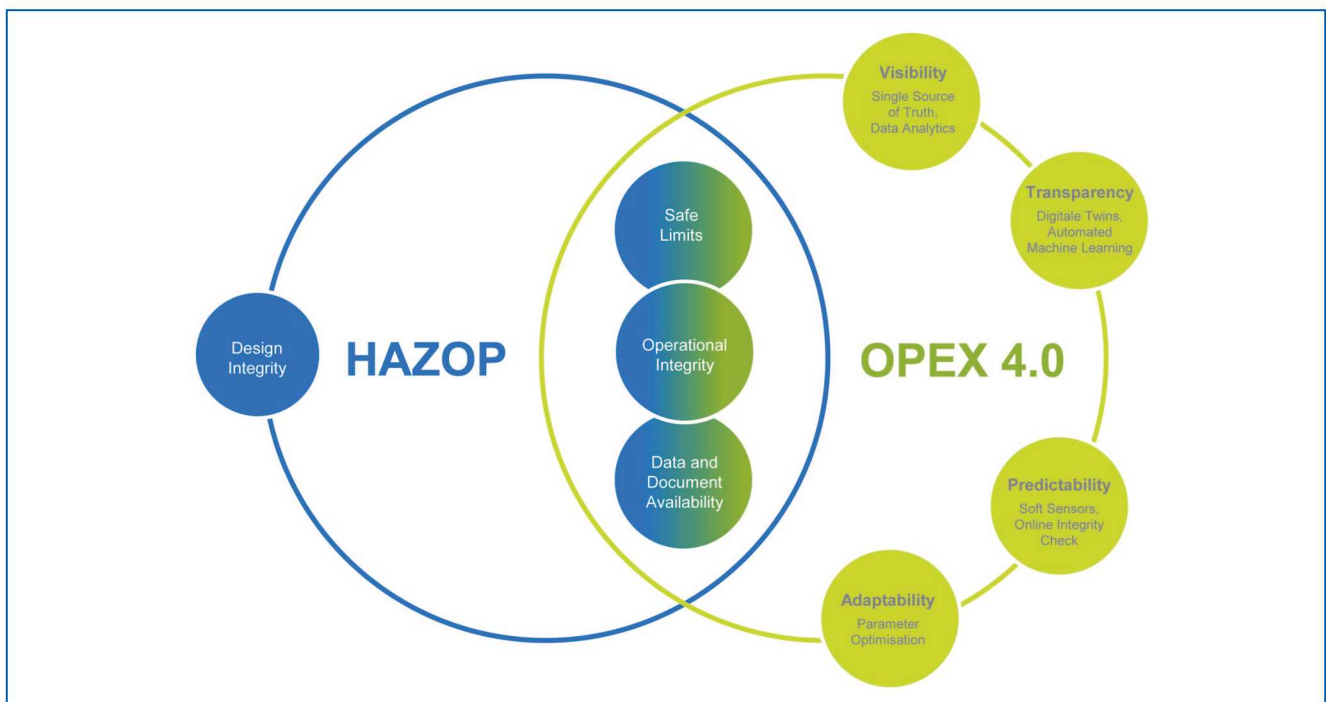


Figure: Synergetic data collection, evaluation and use enable integrated, cost-efficient HAZOP and OPEX analyses



Synergy

The synergy starts with an AI-based optimisation of the production process, which is strictly oriented towards the VDI guideline **VDI3714 "Implementation and operation of Big Data applications in the manufacturing industry; implementation of Big Data projects"**¹⁾. Our partner atlan-tec Systems carries out your OPEX 4.0 project using systematic, structured and standardised AI methods, and our experts certify the process of the AI-based optimisation project in accordance with the specifications of the VDI guideline. In this way, we enable **successful OPEX projects and legal certainty** with regard to the methods used.

The analysis of the operating data of the last few years shows periods of better and worse operation.

The 'good' operating periods form the basis of the optimisation. Automated machine learning is used to generate a statistical model that captures the mutual dependencies of the relevant operating parameters. With the help of a digital twin, the optimal operating mode of the system is determined and tested. In the next step, with the help of an 'optimiser', the plant is always controlled close to the optimal conditions, which are aligned with a defined target value, such as EBIT per hour.

The 'bad' operating periods that occur as a by-product in an optimisation project are now in turn valuable information for the HAZOP study. By taking these real operational problems into account, the HAZOP study gains relevance and can address the causes that often also negatively influence plant and process safety.

Based on the 'good' and 'bad' operating periods, the HAZOP study can **define limits for the safety devices more precisely and provide safe limits for optimisation**.

Your advantages at a glance

- When preparing the HAZOP study and machine learning based OPEX project, you leverage synergies that save time and effort.
- The HAZOP study benefits from the systematic operational data analysis of the OPEX 4.0 approach and becomes better focused on the real problems in the plant. Your plant gains real safety as a result.
- You use the in-depth analysis of your process using modern big data analysis methods and automated machine learning for data-based plant and process optimisation.
- You eliminate the risk of exceeding safe limits in plant and process optimisation and gain optimisation leeway.
- Your plant is operated with increased stability at the optimum operating point, which means savings and increased profitability for you.
- Your plant and process safety is up to date and fulfils the legal obligations.
- The end result is that your production plant becomes safer and more economical.

¹⁾ Many a Big Data/KI-based project fails due to a lack of prerequisites or an unsystematic approach, and is abandoned without success. To remedy this, the VDI developed the guideline VDI3714 under the leadership of Thomas Froese, managing director of our contractual partner atlan-tec Systems.

