PPE intelligence
translating process into facility
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THE HIERARCHICAL LAB

CONTACT PERSON

Dr. Frank Bernhardt
Director Laboratory
Senior Expert Laboratory

> 30 years of professional experience in the pharmaceutical industry

frank.bernhardt
@ppe-intelligence.com

ABSTRACT
Laboratory design is not solely based on functional or aesthetic considerations, but often also reflects the demands and hierarchies of the organization.
Addressing these issues is an important task of laboratory planning.

Laboratories used to be strictly hierarchical. At the top were directors, laboratory managers, and senior assistants, below them assistants and laboratory technicians – often an exclusively male domain. At the bottom of the hierarchy were unskilled laborers, so-called lab servants, who had to perform simple, dangerous, or monotonous tasks.

These individuals usually had no workplace safety. Until the early 20th century, for example, it was common practice in laboratories to pipette liquids by mouth. Lab benchtops were often cleaned with benzene. Constant exposure to toxic substances in unsuitable environments without personal protective equipment frequently led to chronic illnesses and premature death.

Laboratories were often affiliated with a clinic or medical institute and headed by an ordained professor of medicine. Accordingly, the architecture of such buildings usually reflected the medical hierarchy within the clinic.

There were private laboratories belonging to the institute director, special budgets for research and development, and preferential access to personnel resources.

Organizational rank was also expressed, not least, in the footprint of the laboratory spaces. Rooms were arranged in a series of self-contained suites, without any consideration for efficiency or cost-effectiveness.

Fig. 2: 19th century lab workplace free of occupational health and safety

Fig. 1: Typical 20th mid-century laboratory environment
Courtesy of Stiftung zur Industriegeschichte Thyssen, Duisburg (F/CHH/7/1/6)

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All that seems like ancient history? Some of it has survived to this day. For example, many institutions still have a hierarchical dress code with gray coats for technical staff and white lab coats for laboratory personnel. We also repeatedly observe the tendency for departments to stockpile everything they need for daily operations without having to share with other departments. This creates small, autonomous "kingdoms" with corresponding territorial claims, where the crucial informal exchange between departments suffers.

Especially in modern high-throughput QC laboratories with their high degree of automation and largely standardized processes, break times must be actively scheduled into shifts. Similarly, documentation areas and offices should not only be planned from a purely functional perspective, but also as places for direct verbal communication in the hectic daily laboratory routine. The laboratory operator also has a responsibility in this regard. Regardless of the building's design philosophy, good and functional design can support and promote this informal exchange. Furthermore, shared spaces can lead to synergies, such as savings in shared storage areas. A well-planned laboratory concept is a prerequisite for this. Our planning begins with the initial dialogue with the operator.

Fig. 3: Focused lab work

Fig. 4: Rendering of a laboratory workplace

All laboratory planners at PPE intelligence come from the laboratory, understand daily laboratory routines, and are familiar with the specific requirements of laboratory operations.

Together with the other disciplines of architecture, building physics, building services engineering, and facility management, as well as the users on the client side, they form the integrated planning team that determines the design principles throughout the entire project and translates them into the laboratory: Translating process into facility. The focus is always on the people who should find their best possible working environment here.

Fig. 5: Modern laboratory workplace with equipment installed

Experience has shown that user requirements can change during a project or may not even be defined at the outset. Planning results must be continuously compared with these requirements – or adapted to new circumstances. To accommodate this iterative planning process, a structured approach with thematic workshops, each building upon the previous one, has proven effective during the planning phase. Regular coordination meetings with all stakeholders complement the meeting schedule during this phase.

PPE intelligence delivers an integrated, end-to-end approach to laboratory planning – translating process into facility.

WHAT'S IN IT FOR YOU

Laboratory efficiency and worker´s satisfaction is largely determined by the suitable lab- and workplace design.
Before starting a laboratory project, consult your stakeholders to collect and validate all design requirements.

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"Super Integrated BIM" integrates all disciplines into a harmonized data environment, ensures a Single Source of Truth, and is governed by BIM Management. Get more insights on this comprehensive topic and how it is crucial for effective project planning.

NICE TO KNOW

PPE intelligence is an independent consulting and engineering company within the PORR Group. We focus on biotech & pharma, research & laboratory, as well as logistics & advanced factory planning. The PORR Group employs around 21,000 people, including more than 1,000 engineers.

Together, we combine **Engineering Agility** with **PORR Stability**.