INTRODUCTION

This purpose of this poster is to illustrate and give an insight into the challenges related to building high containment animal facilities in a region with very few high containment animal facility references and a slight effect of limited local experience with biocontainment engineering and biorisk. All these projects have a lot in common. They are all dealing with the complexities of all high containment projects, but also have some additional challenges. All the projects have proponents including unknown high stake biological agents. Also, the projects have been initiated and/or managed by the Norwegian veterinary institutes, where the stakeholders, such as researchers and maintenance representatives etc. have offered many of the above-mentioned challenges. The projects are quite different in sizes (m²) and context – one of them a 300 m² BSL3/ABSL3/GMO3 lab in a city environment, and the other project a 63 000 m² facility for the Veterinary Institute and the Veterinary Medical Faculty, illustrating the extents, volume and size of the new facilities for the Veterinary Institute and the Veterinary Medical / Norwegian University of Life Sciences and the Norwegian Veterinary Institute within campus Ås outside Oslo, Norway. The project design group is a consortium of Henning ØKOSySTEM, + INDUSTRIPRODUKT + EKSISTERE Contemporary, DET NyE BIOVAF, Hjellnes Consult, (NO) and LINK landskap (NO).

PROJECTS:
The current projects for high containment animal facilities in Scandinavia have a lot in common and yet they have major differences. How are they different and how are they alike?

- Addressing high containment animal facility projects, when the majority of relevant biological agents are unknown
- Limited local biocontainment and biorisk design experience
- Making best and most efficient use of the local biorisk knowledge among consultants and user groups
- Creating consciousness and awareness of biorisk as main design driver in this type of project groups among less experienced stakeholders

PROJECT APPROACH AND METHODS

The project approaches for the current projects have been quite different and yet they have similarities in how to address the extra project challenges related both to high containment facilities and less experienced project groups.

Project approaches in general relate to the value of regarding high containment animal projects as very different from other types of facility projects.

- Already when regarding high containment projects as a different "creative", it calls for a quite different approach for executing the project. Here, it can be quantified, that these projects will benefit enormously from the frontloading of the projects. Fromloading basically means considering the interdisciplinary design basis in the earliest project programming phases.

An additional approach is to use a project method that clearly communicates biocontainment driven issues and basis for design to all relevant project stakeholders. This is even more relevant when the design basis include unknown biological agents.

One of the methods to secure a common basis and to keep perspectives on biocontainment in groups with limited experience is the use of generic tool project specific biocontainment typologies. These supports overview, interdisciplinary and common understanding, defining frames for high biocontainment in situations with unknown biological agents. The current experience with the use of biocontainment typologies have demonstrated many benefits for the project stakeholders as a whole.

RESULTS/DISCUSSION

Based on the facts of limited number of animal high containment projects in Scandinavia combined with limited biocontainment design and biorisk experience among users and consultants, the four current and largest projects in Scandinavia have offered many of the above-mentioned challenges. Challenges are mainly related to initial project execution methods and project organizations that mainly have been based on traditional project organizations and traditional dis- cipline involvement from "traditional" architectural and engineering firms. Also, the use of biocontainment typologies have proved to be a useful method and working tool in these complex containment projects involving project design groups with limited biocontainment experience. This tool has so far been tested in two large complex veterinary university campus projects as well as a smaller animal facility project, spanning biocontainment levels from BSL2 to BSL4.

One of the projects has already benefited from frontloading activities related to dedicated work executed on common basis of bio- and biocontainment engineering. Also, the use of global biocontainment networks have already proven to be essential and planning of continuous third party project reviews and evaluations involving animal biovety professionals are expected to be main milestones for the final project success.

CONCLUSION/FOLLOW-UP

The challenges present when working with high containment animal facility projects have proven to be multiple. When the local experience with biocontainment and animal facilities is limited, it can be concluded that it adds tremendously to the challenges, on top of the fact, that projects for high containment animal facilities are already packed with complexity. It is expected that the ongoing high containment projects will continue to be challenging, mainly related to identify project organizational issues, and especially challenges where the biobank project basis has been less frontloaded.

The ongoing Scandinavian high containment animal facility projects will benefit from continuous focus on using global bio- safety and animal containment networks as well as planning for continuous design reviews involving experienced outsiders for keeping the projects on track.

Also when using the "biocontainment typologies" they will be continuously used and updated throughout the project lifetime for common basis and communication.

KEY TAKE HOME MESSAGES

- Project organizations with limited local experience of high containment only adds to the project challenges and require additional support in terms of external experts and multiple benefits from using biocontainment typologies as common base.
- Responsibilities and roles in the interdisciplinary project groups of project design group, consultants and user groups should be clearly defined and detailed from the very beginning of the project. This can also identify potential competency and exper- tise gaps at an early stage.
- Frontloading of high containment animal facility projects have proven efficient and beneficial for cooperation, common project concepts and continuous life cycle design development. In high containment animal facility projects with unknown biological agents it has proven very useful to establish ‘biocontainment typologies’ as common base and discussion frame for relevant biocontainment in the facility design.

EXAMPLES OF UPCOMING HIGH CONTAINMENT ANIMAL FACILITIES IN SCANDINAVIA

How are they different and how are they alike?

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