

## P3 Draft reflection

When I started the research, I didn't have much knowledge about fire safety and the effects of a fire safety approach for the design of buildings. The first step was to gain understanding of the subject. This was done by researching literature on fire safety, searching for information about (newer designed) hospitals and also the relationship between fire safety and hospitals. Also the effect of the current regulations as stated in the Dutch Building Decree for designs of hospitals. In this phase the question arises more and more that current regulations are too strict and too focused on square meters, and if I was able to find a more integrated approach that matches the real problems of fire safety that are currently present in hospitals.

### Approach

One of the objectives of the research was to categorise data from egress times for different types. After literature research I wasn't able to find already existing data. Therefore experiments in real hospitals were required.

By recording an evacuation drill of an entire ward in an older hospital a lot of knowledge and data about the behaviour of staff could be gathered. The most important observations were that the level of trained staff is very important for the required egress time of a ward. The recordings also showed that if a hospital ward has only one exit that can be used for evacuation of beds, the required egress time increases a lot. If the bedridden patients need to be evacuated by using a movement device for evacuation on stairs, a successful evacuation seems to be unreachable. The evacuation drills showed that if there is fire in the corridor area, a successful evacuation is in danger and likely to be impossible.

The evacuation drills in the second hospital are more focused on purely getting data of egress times of specific hospital wards. The data can give an indication for more integrated fire safety concepts per specific ward.

Another objective of the research is to develop a design tool that can help designers to design sufficiently more safe hospitals. Using the probability approach in combination with a verified egress time of the entire ward, a calculated effect can be determined. Different options for the design can be implemented in the probability calculation, and will therefore have an effect on the value that marks the level of fire safety of the layout. The options for designers will be much wider, and more options will be available, that can improve the awareness of fire safety, and also make the hospitals sufficiently safer.

## Research & Design

The aim of the research is to be able to create design guidelines for state of the art fire safety concepts for hospitals. The design trends, actual use and corresponding egress time need to be integrated in the guidelines. With the gathered data an RSET per specific hospital ward can be determined and calculated. With this determined RSET the actual use of a ward can be analysed. The amount of staff present is important for the RSET, and can be customised to get a smaller relative probability of casualties.

By creating a basic value for the probability of casualties of a layout that fulfils the current Dutch Building Decree regulations, wards with a entirely different layouts can be compared on the level of fire safety. Therefore new design trends can be designed which do not focus on complying to square metre regulations, but follow the probability approach to be significantly safer.

The probability approach can also help existing hospitals with less efficient layouts for fire safety, to secure a certain percentage of safety for bedridden patients. An increase of the ASET is an option to have a lower relative probability of casualties, but it can also help to make improvements to decrease the RSET. With this approach hospitals can choose for example to improve in the organisation to decrease the RSET. With these improvements the building can be sustained on an acceptable risk, instead of renovating or building a new hospital.