

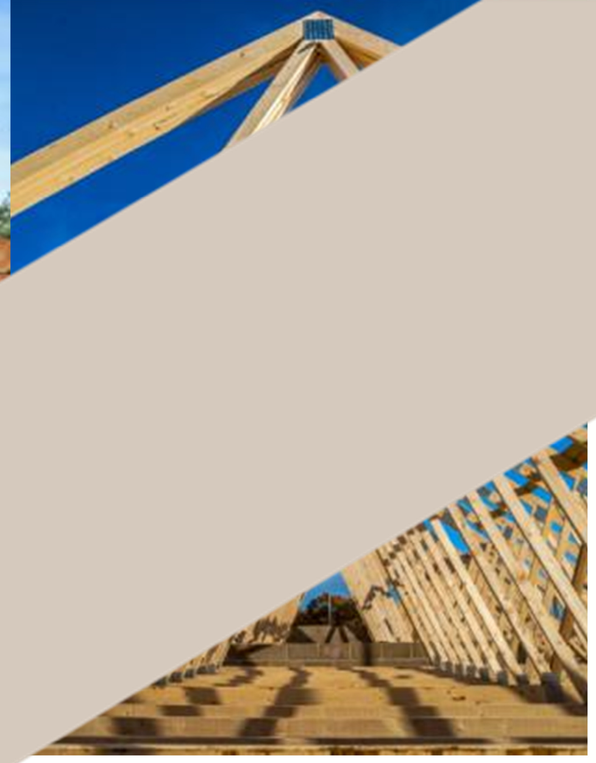

WOODRISE

FCBA INSTITUT TECHNOLOGIQUE

TALL TIMBER FACADES
COST EFFICIENT AND RESILIENT ENVELOPE

Tall Timber Facades
Identification of Cost-effective and Resilient Envelopes for Wood Constructions

PROJECT SUMMARY

With an increasing height of timber buildings the challenge is growing to provide moisture-safe conditions for the expected lifetime of building envelopes. Tall buildings are particularly exposed to high wind pressures combined with driving rain. Additionally, large-scale buildings require longer times of construction in which the structural elements are especially exposed to moisture. Last but not least inspection, maintenance and repair possibilities are limited in high rise structures.
Compared to fire safety and static demands, the risk of failure due to moisture today is dramatically underestimated in planning and building processes and in quality management. Therefore ‘semi-probabilistic safety concepts’, similar to those in static calculations, are necessary to prevent negative consequences caused by inappropriate reaction of construction to climate exposure.
The main objective of the project is to facilitate the confident design of durable and therefore cost-effective design solutions for tall timber facades. A risk based design tool taking into account exposure and vulnerability of façade components and systems consistently will enable moisture safe design.

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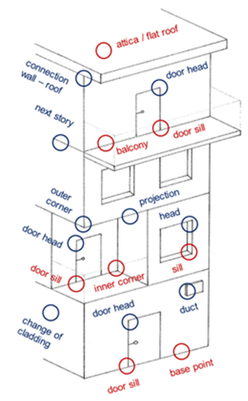
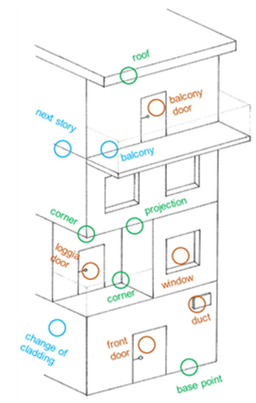
Development and definition of a generalized technique for risk analysis enclosure risk areas

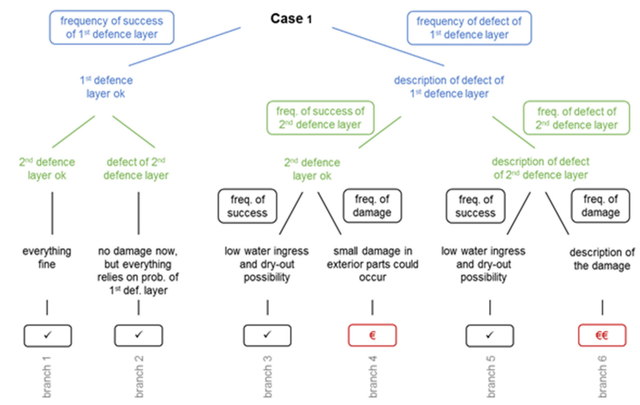
To keep the overview of the numerous details and to analyze them in a systematic way → collect and categorize the possible disturbances.



Categorization: drainage of water
- water can run off quite easily
- water can accumulate

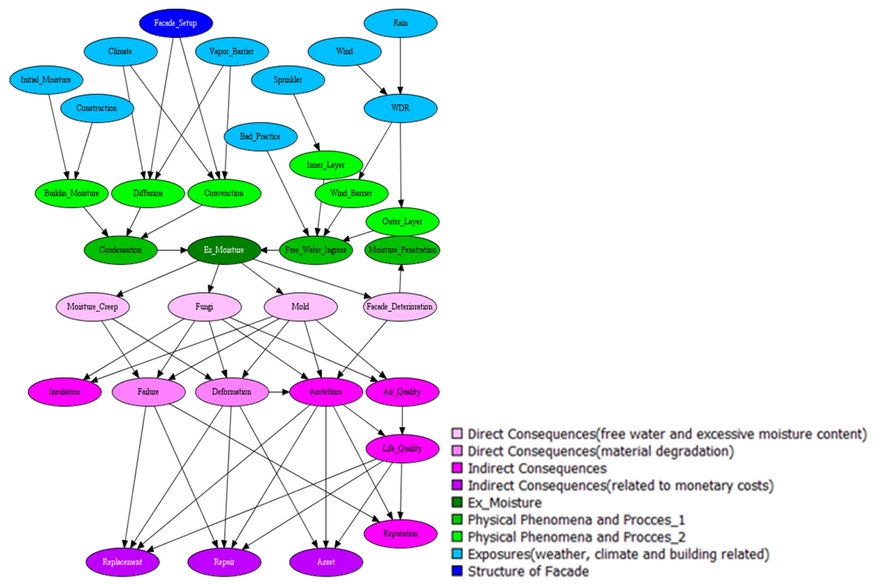


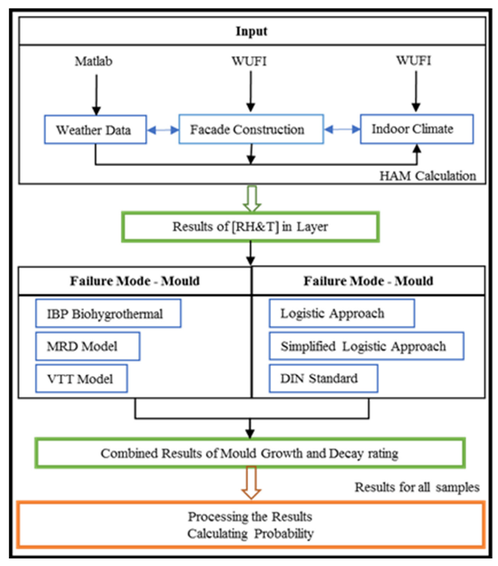
Categorization: interference with barriers
– complete breakthrough
– disturbance is just at the surface
– geometrical changes



Event tree method is used as system analysis tool and for consequence identification

Parametric workflow for probabilistic-based approach and relevant variables and corresponding causal interaction





Conclusions on moisture risk and risk facade tools

- Development of a risk model representation of exposure of exterior walls and facade detailing, considering moisture penetration and accumulation.
- Implementation of various failure modes mold and decay.
- Risk-Façade tool A for a versatile simulation process and to determine of indirect consequences in terms of repair or maintenance cost.
- Derivation of a generalized procedure for risk assessment of envelope details based on an event tree methodology (RiFa-Tool B).
- RiFa-Tool B is also usable as a reverse consequence-based method to evaluate connections or joints of moisture risk areas.
- Monetarization of consequences demonstrated the relevance of moisture safety measures in order to avoid very high damage costs for timber construction companies.

www.tallfacades.eu