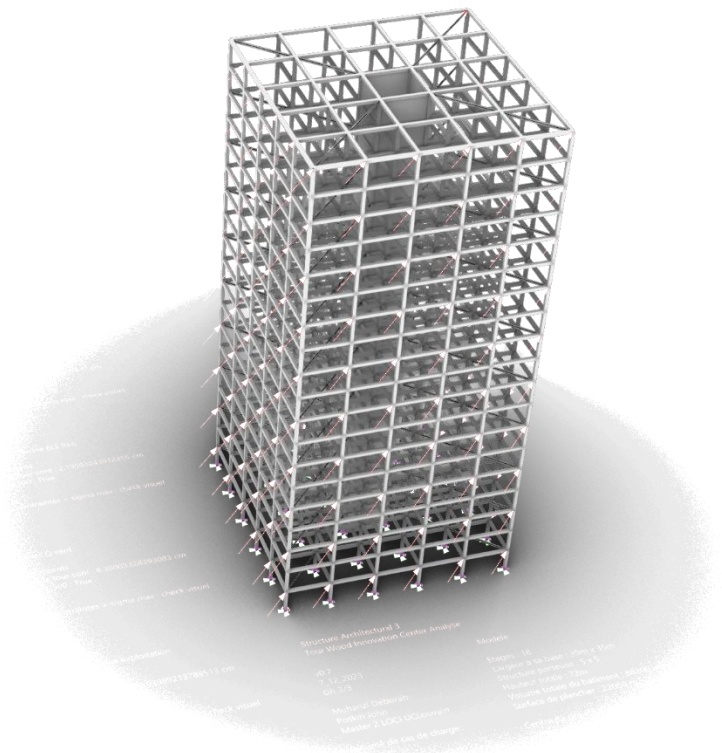


Ensemble des programmes

Création d'un outil permettant un apport de connaissances aux concepteurs dans les phénomènes de vent, dans le cadre de son élaboration de la conception schématique pour un bâtiment de moyenne hauteur.





Programmes Grasshopper mémoire

Ce document rassemble l'ensemble des codages Grasshopper utilisés lors du mémoire. Il comprend les calculs de structure pour les différents cas de charges vu dans le cours LICAR2711 Structure architecturale 3, le programme principal de « Conception Papillon » ainsi que ses sous-programmes et les géométries prédéfinies. Chaque code est accompagné de sa version simplifiée, par cluster si nécessaire. Des exemples de résultats des programmes sont également joints.

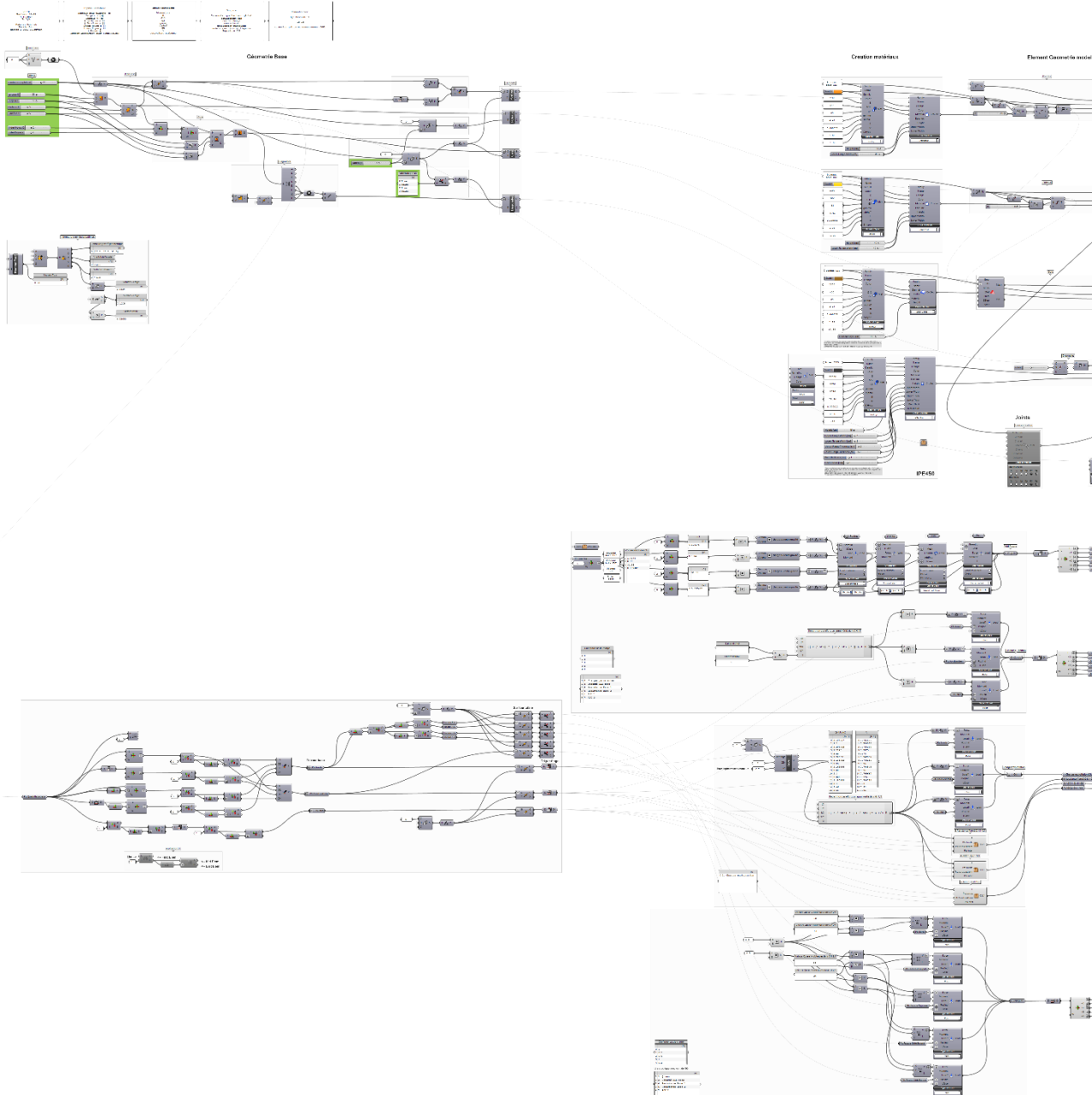
Sommaire

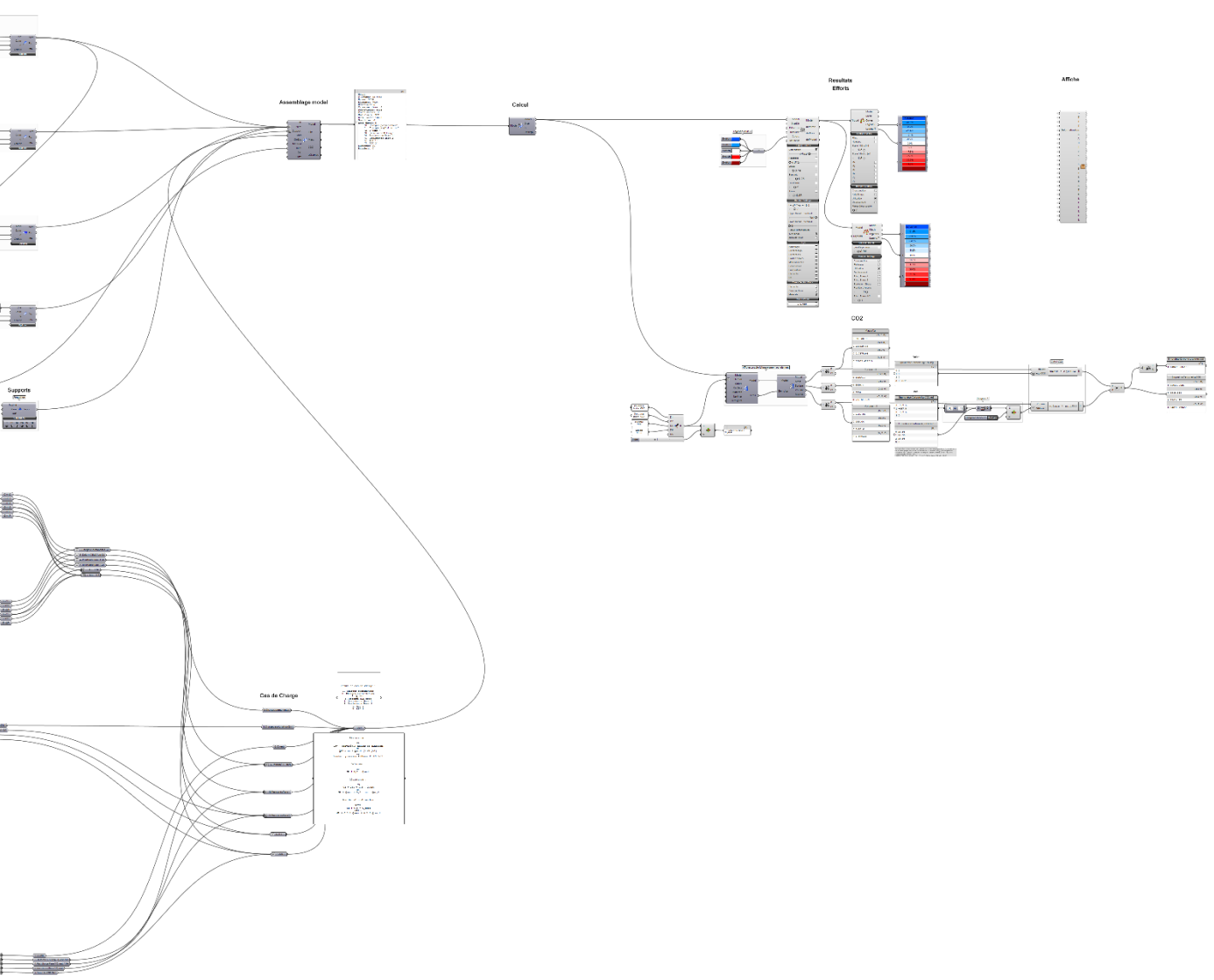
STRUCTURE LICAR2711	2
ANALYSE GÉNÉRALE V0.10 35X35	2
ANALYSE FAÇADE V0.5 35X35.....	6
CAS SIMPLE COMPARAISON 35X35	8
CONCEPTION PAPILLON	10
STATION MÉTÉO.....	13
SIMULATION CFD	16
NBN EUROCODE 1	20
GUIDE GÉOMÉTRIE	24

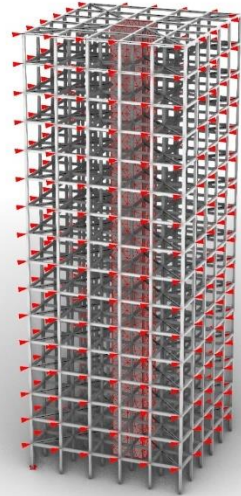
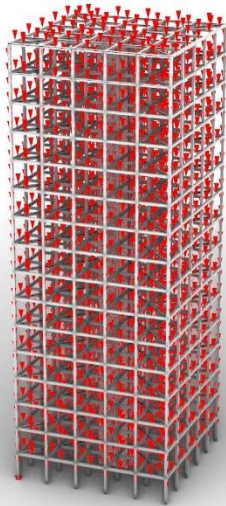
Structure LICAR2711

Analyse générale v0.10 35x35

Analyse Batiment Complet







Modele avec Accidental combination 2

Les déplacements
en tete de la tour sont : 3.83882230911072 cm
Condition H/500 : True

Modele avec Accidental combination 1

Les déplacements
en tete de la tour sont : 1.30982248834155 cm
Condition H/500 : True

Modele avec Resistance Rare 2

Les déplacements
en tete de la tour sont : 7.22014244121213 cm
Condition H/500 : True

Modele avec Resistance Rare 1

Les déplacements
en tete de la tour sont : 4.23710350452227 cm
Condition H/500 : True

Modele avec Deformé ELS freq

Les déplacements
en tete de la tour sont : 1.89108110712304 cm
Condition H/500 : True

Modele avec Q vent

Les déplacements
en tete de la tour sont : 6.75275582127687 cm
Condition H/500 : True

Modele avec Charges exploitation

Les déplacements
en tete de la tour sont : 2.82106353082856 cm
Condition H/500 : True

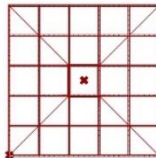
Modele avec Charges permanentes

Les déplacements
en tete de la tour sont : 1.30982248834155 cm
Condition H/500 : True

Condition contraintes - sigma max : check visuel

Pour le cas selectionné:

Utilisation poutres/poteaux :
C : -42.7% T : 37.1%
Utilisation noyau :
C : -45.4% T : 24.6%



Structure Architectural 3
Tour Wood Innovation Center Analyse

v1 0.11
Batiment 25x25
11_12_2023
Gh 3/3
Muhamad Déborah
Poskin John
Master 2 LOCI UCLouvain
Résumé de cas de charge :

- 0. Charges permanentes
- 1. Charges exploitation
- 2. Q vent
- 3. Deformé ELS freq
- 4. Resistance Rare 1
- 5. Resistance Rare 2
- 6. ACC 1
- 7. AAC 2

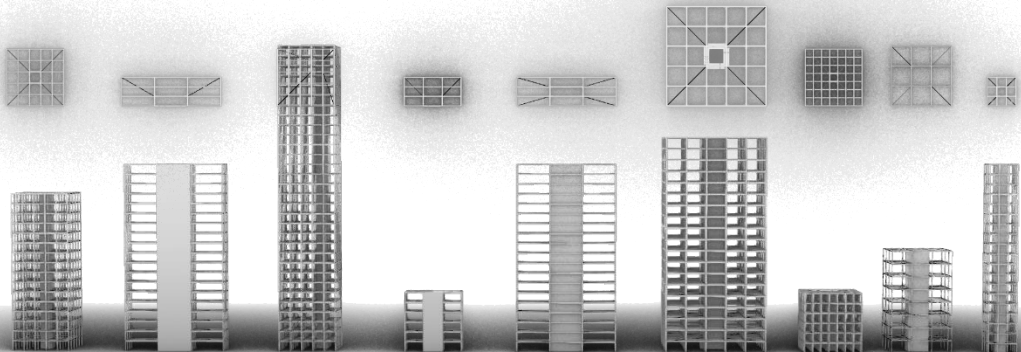
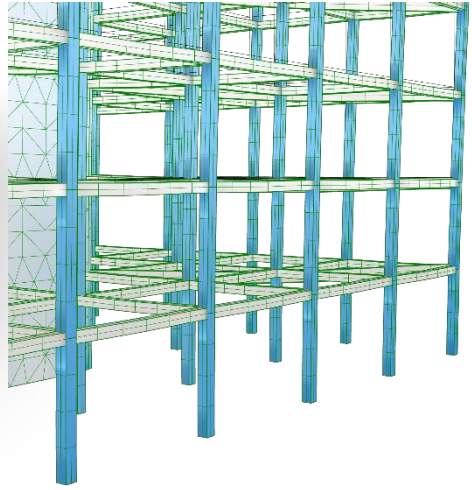
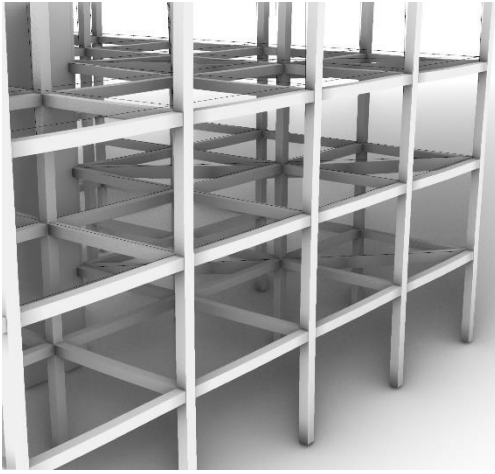
Modele

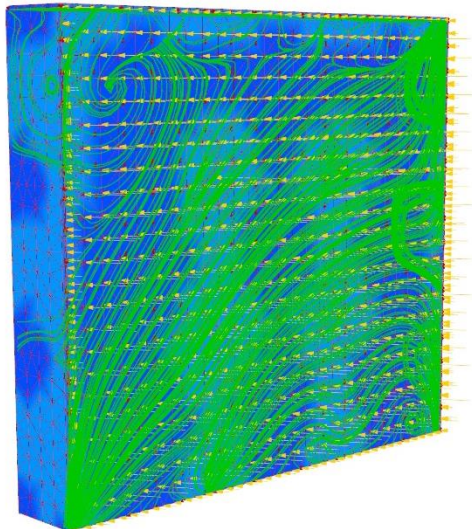
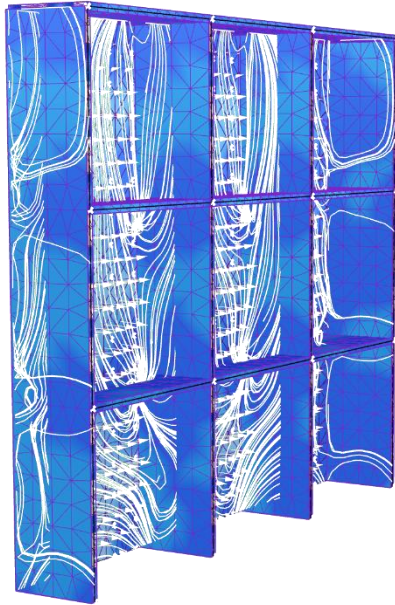
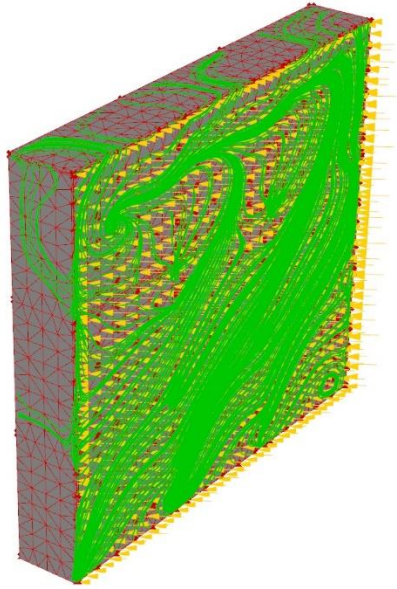
Étages : 18
Longeur à sa base : 25m x 25m
Structure porteuse : 5 x 5
Hauteur totale : 63m
Volume totale du bâtiment : 39375 m³
Surface de plancher : 11250 m²

Centre de gravité géométrique : (12.5, 12.5, 31.5)
Centre de gravité de masse : 12.5020000000005, 12.5020000000001, 34.0276463238634

Sa masse de structure est de : 6168.14777913341 T
Noyau CLT : 2262.33000000004 T
Poteaux-Poutres : 3437.21009999999 T
Acier : 478.60568131546 T

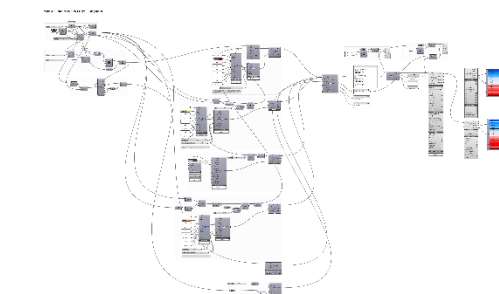
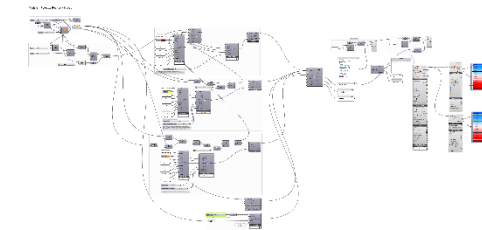
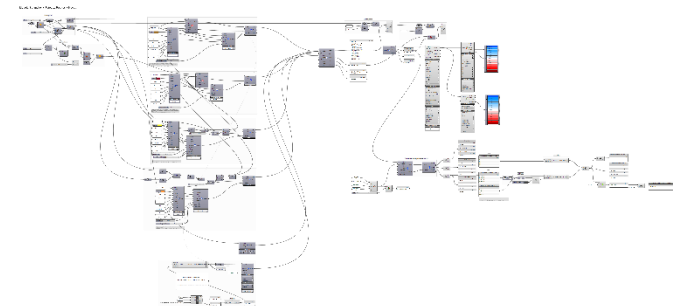
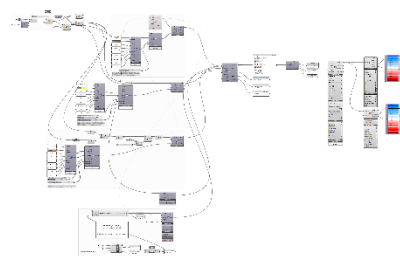
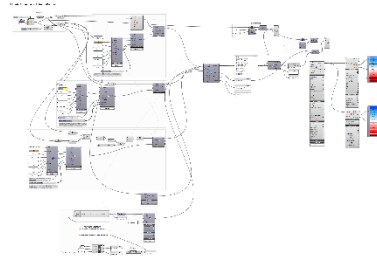
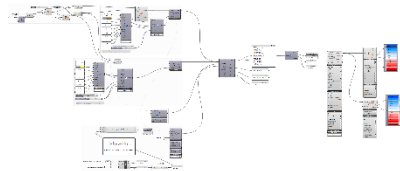
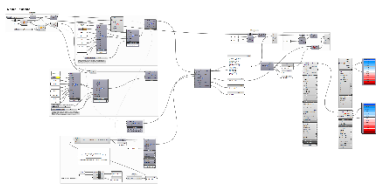
Son empreinte carbone est : 796.360104013988 T CO2

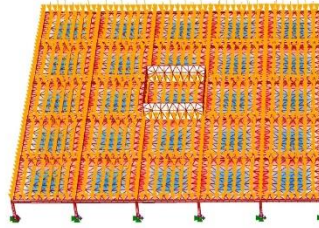
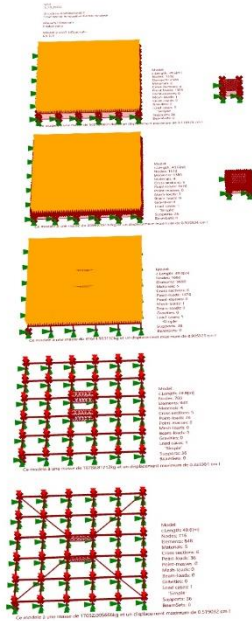




Cas Simple comparaison 35x35

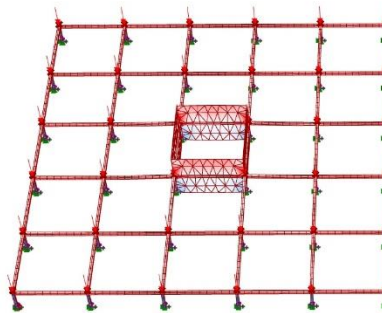
Cas simple par un seul plateau





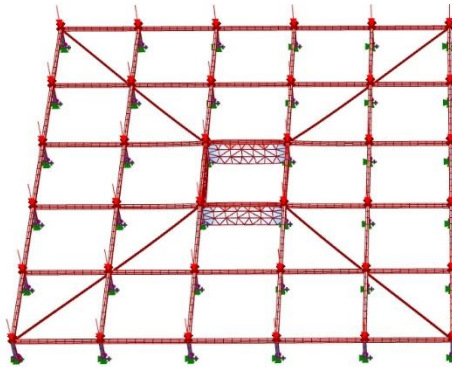
Model:
 c.Length: 49.8[m]
 Nodes: 1660
 Elements: 3690
 Materials: 5
 Cross sections: 6
 Point-loads: 1476
 Point-masses: 0
 Mesh-loads: 1
 Beam-loads: 0
 Gravities: 0
 Load cases: 1
 'Simple'
 Supports: 36
 BeamSets: 0

Ce modele à une masse de 31661.983132kg et un déplacement maximum de 8.905325 cm !



Model:
 c.Length: 49.8[m]
 Nodes: 760
 Elements: 940
 Materials: 4
 Cross sections: 5
 Point-loads: 36
 Point-masses: 0
 Mesh-loads: 0
 Beam-loads: 0
 Gravities: 0
 Load cases: 1
 'Simple'
 Supports: 36
 BeamSets: 0

Ce modele à une masse de 16788.81712kg et un déplacement maximum de 0.333381 cm !

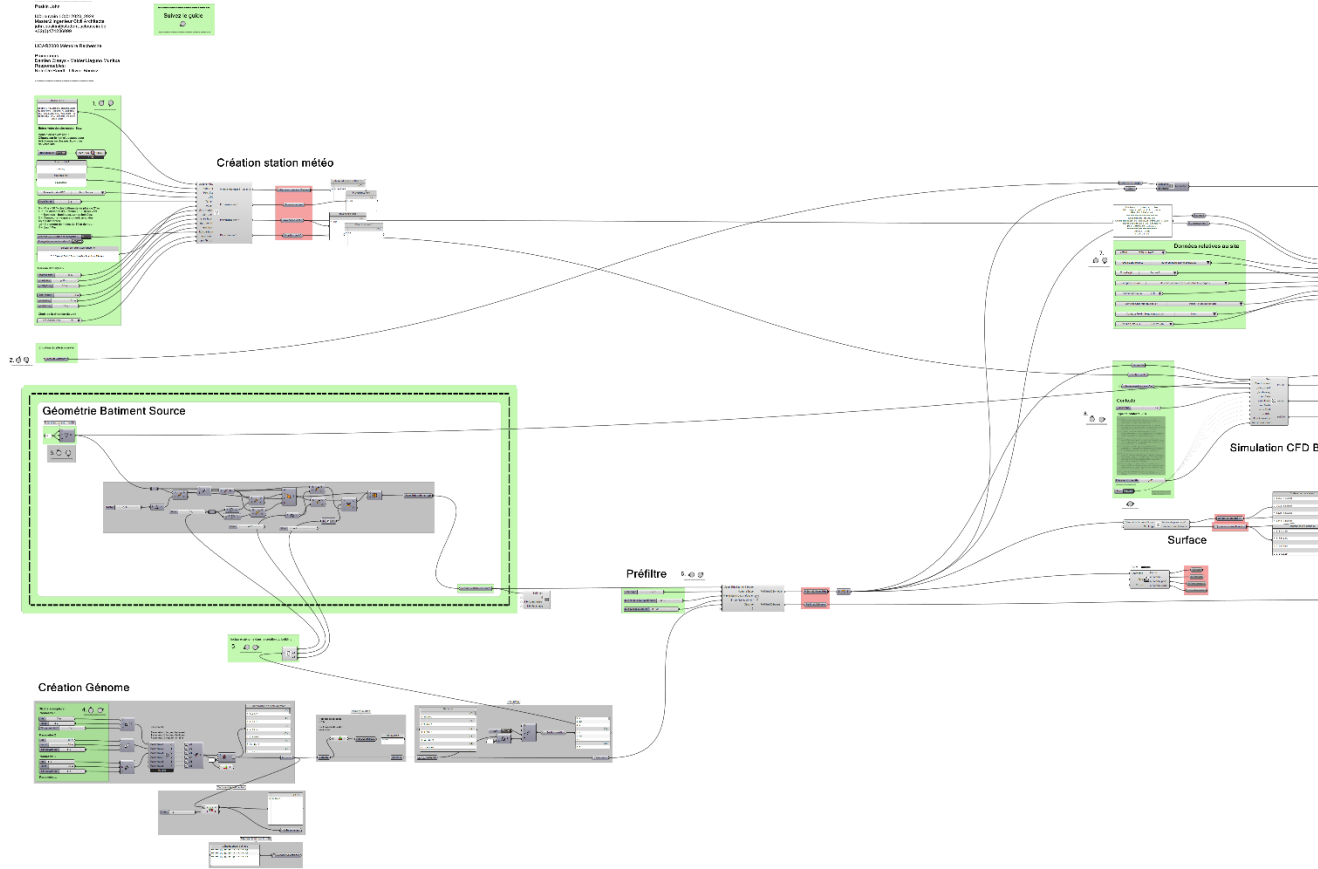


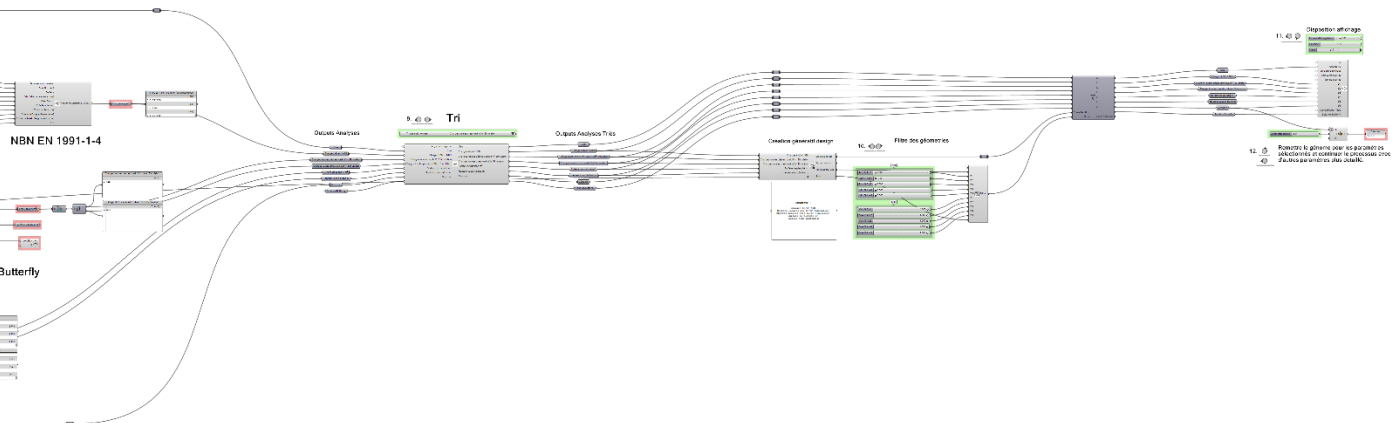
Model:
 c.Length: 49.6[m]
 Nodes: 716
 Elements: 848
 Materials: 5
 Cross sections: 6
 Point-loads: 36
 Point-masses: 0
 Mesh-loads: 0
 Beam-loads: 0
 Gravities: 0
 Load cases: 1
 'Simple'
 Supports: 36
 BeamSets: 0

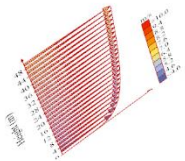
Ce modele à une masse de 17032.005666kg et un déplacement maximum de 0.519032 cm !

Conception papillon

Conception "Papillon"





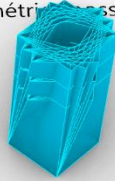


Station Météo Site

Wind Speed (m/s)
 city: Darbois
 country: Belgique
 time zone: 1
 source: SRC-FMVA (modified)
 period: 8:00 to 12:01 between 12 and 14 (z1)
 data for (GPP) of the time = 0 hours.
 Each closed pole line shows frequency of 11.3% = 49 hours.

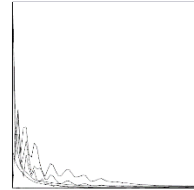


Géométries possibles



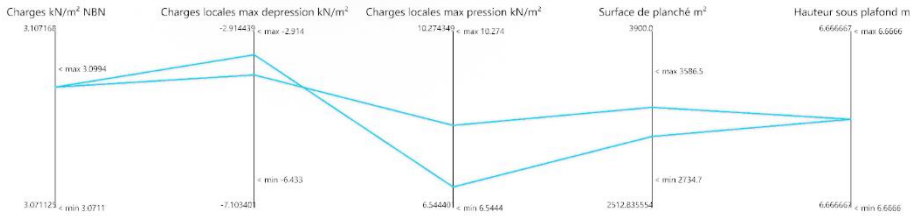
Le modèle comporte
 3 paramètres
 Le nombre de combinaisons
 possible est 45

Controle résidus simulation

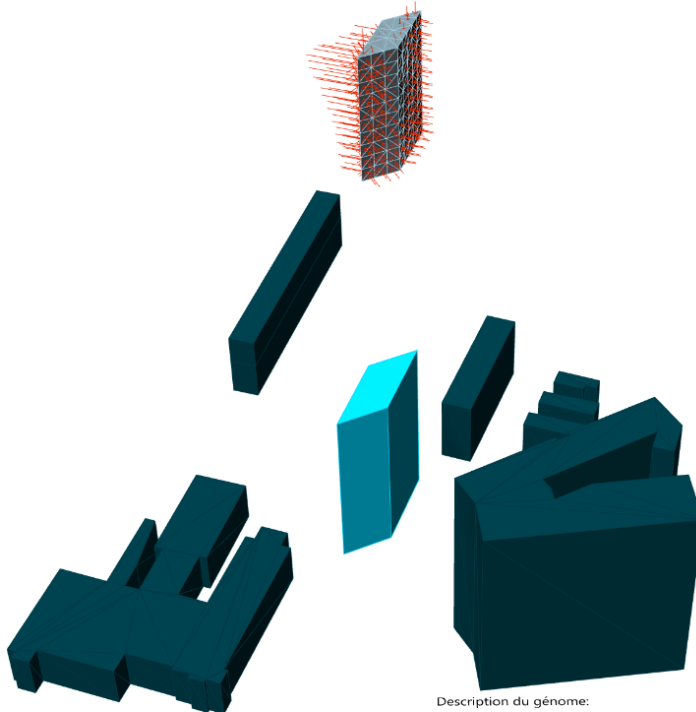


La simulation de vent a été
 calculé pour 1 cas
 Le modèle converge ?
 Si oui, continuer le processus.
 Si non, tourner la simulation sur "False"
 et augmenter la précision du modèle.

Génératif design



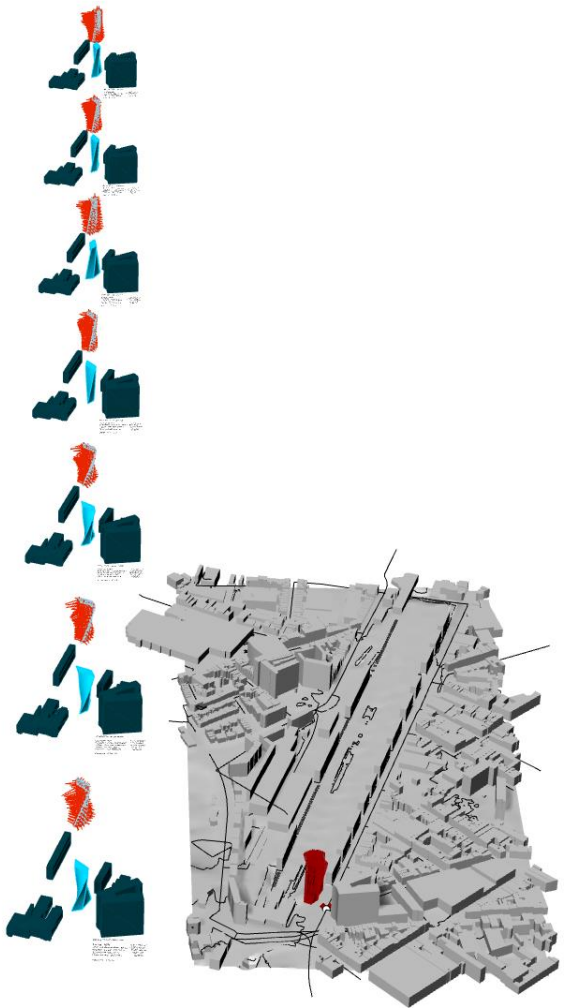
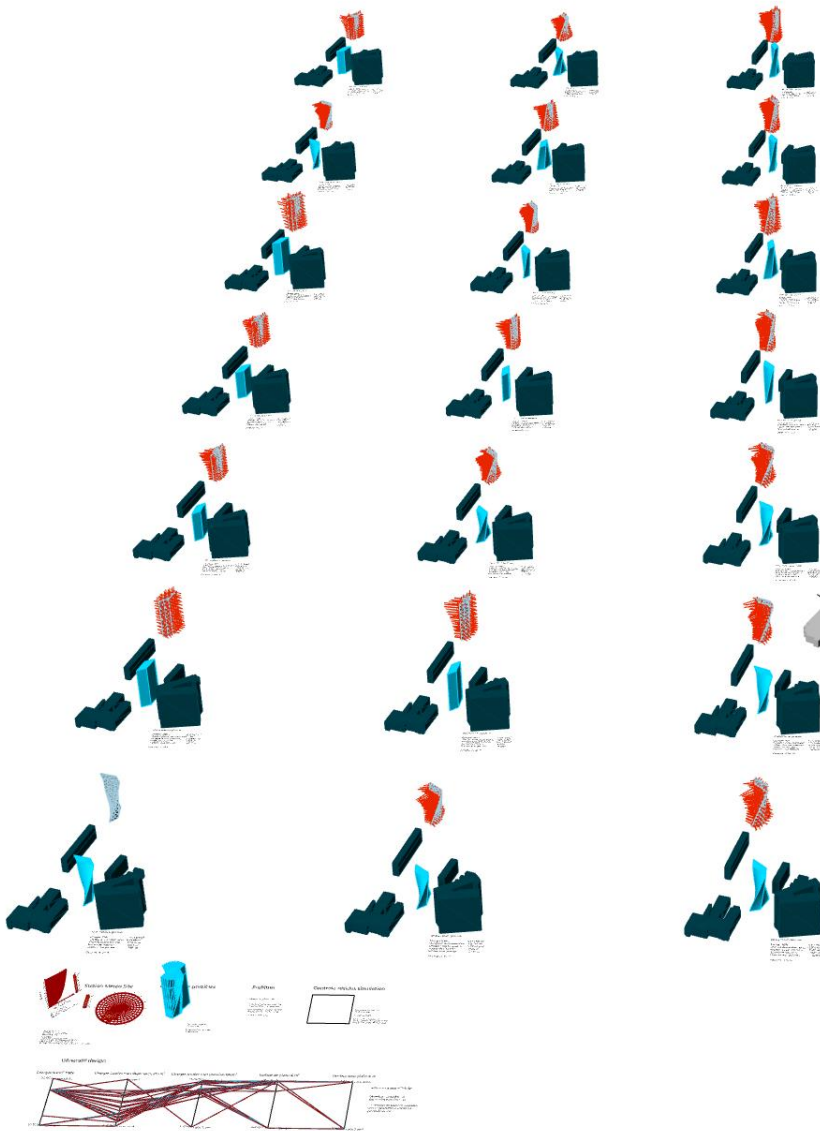
Actions sur le génératif design :
 Géométries analysées : 9
 Géométries écrites filtre : 2
 -> Analyser les solutions proposées
 pour la génération et choisir les
 génomes retenus



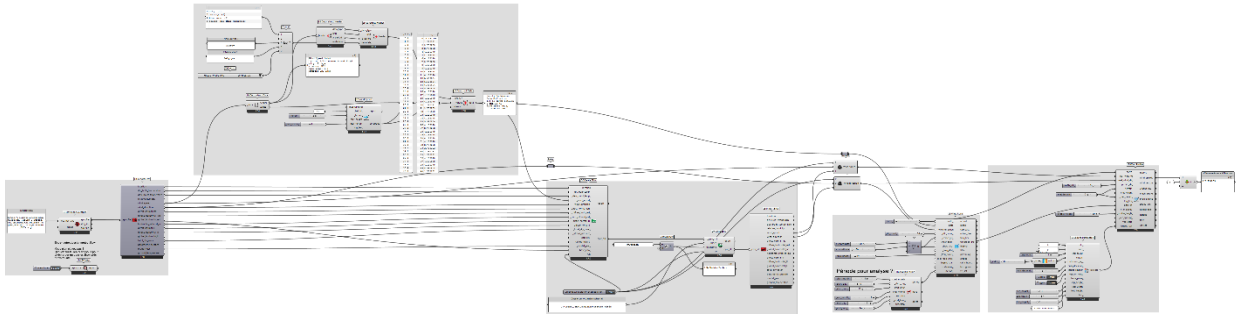
Description du génome:

Charges NBN : 3.171 kN/m²
 Charges locales depression : -4.86 kN/m²
 Charges locales pression : 7.673 kN/m²
 Surface de planché : 4585 m²
 Hauteur sous plafond : 3.949 m

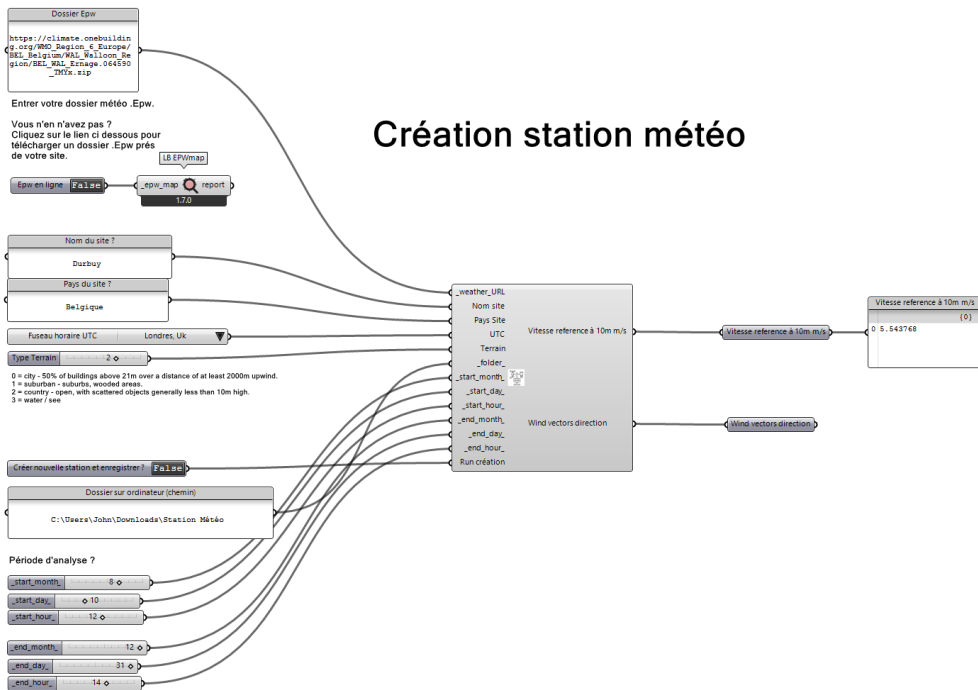
Génome : 0-10-15

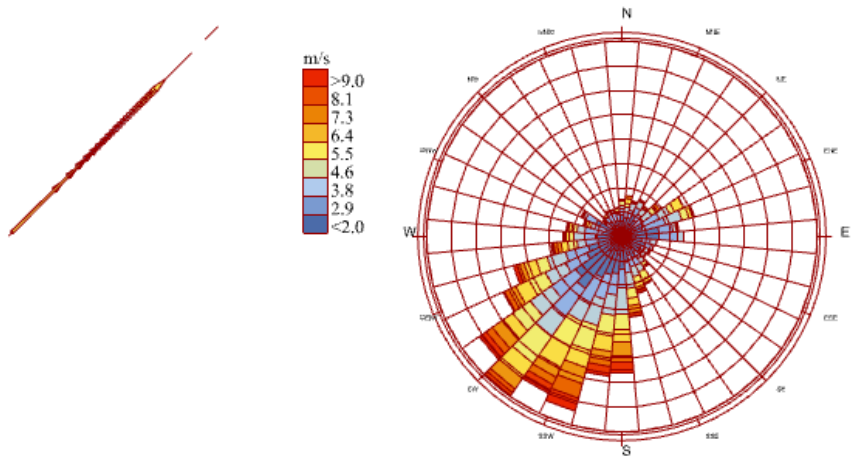


Station Météo

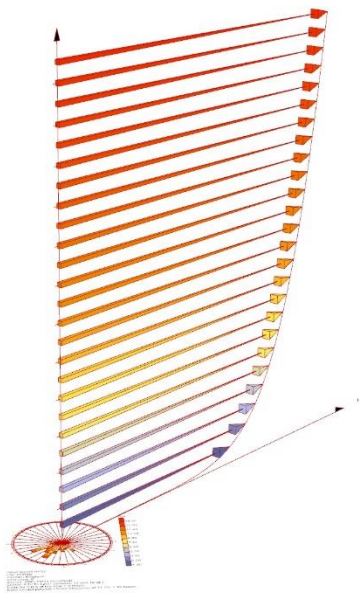


Création station météo

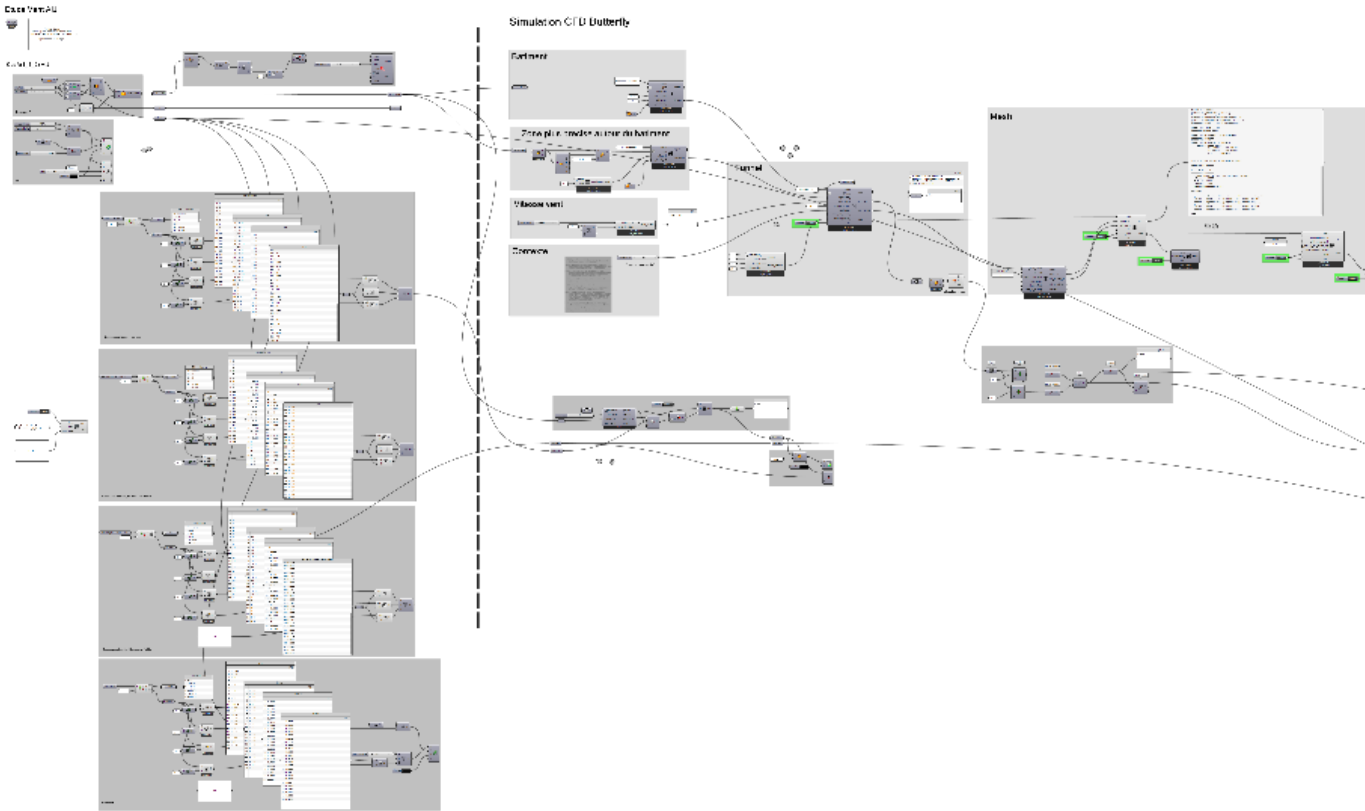


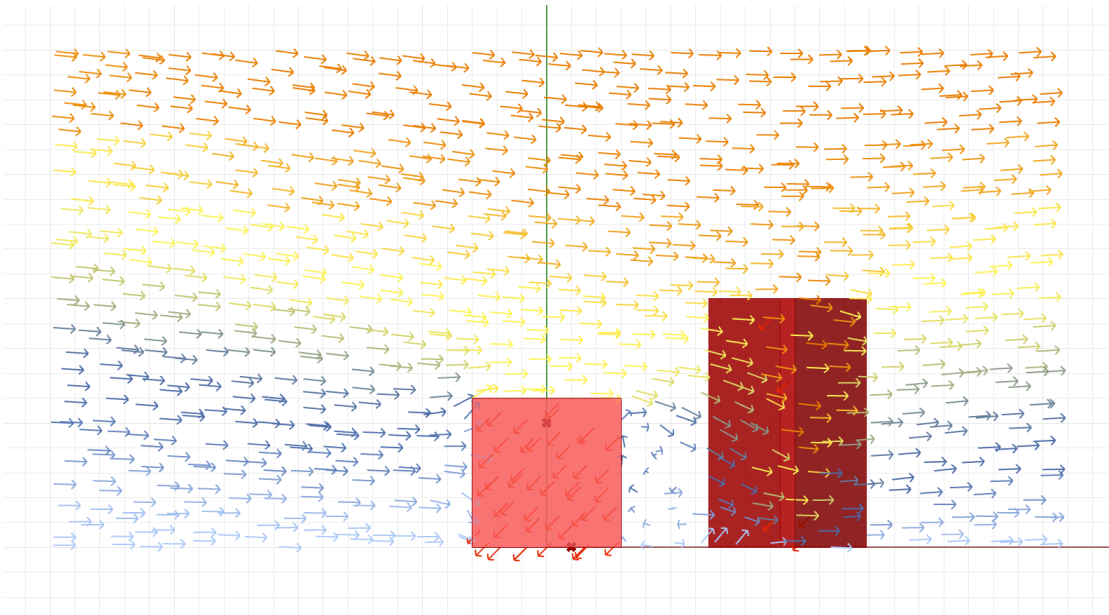
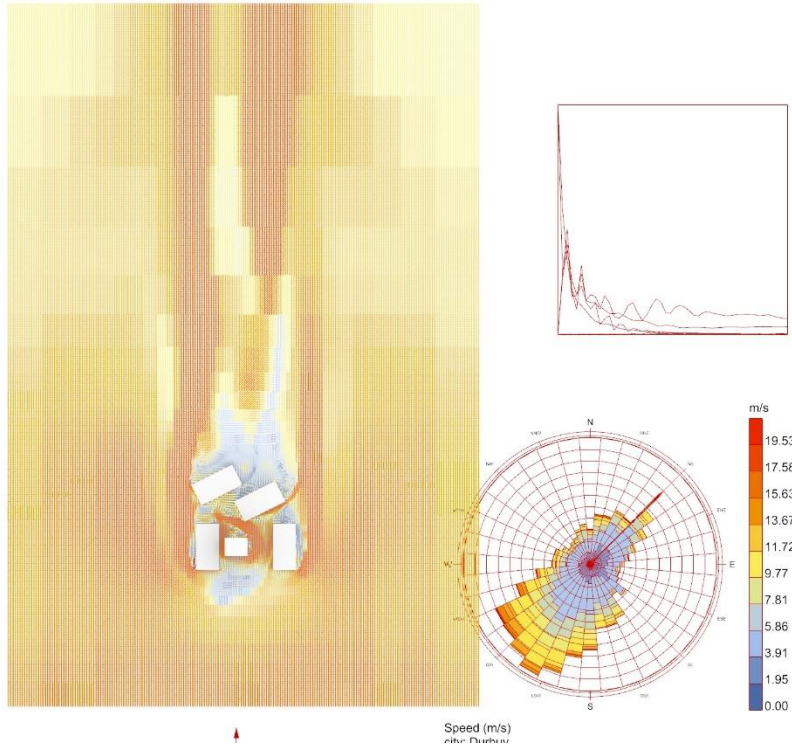


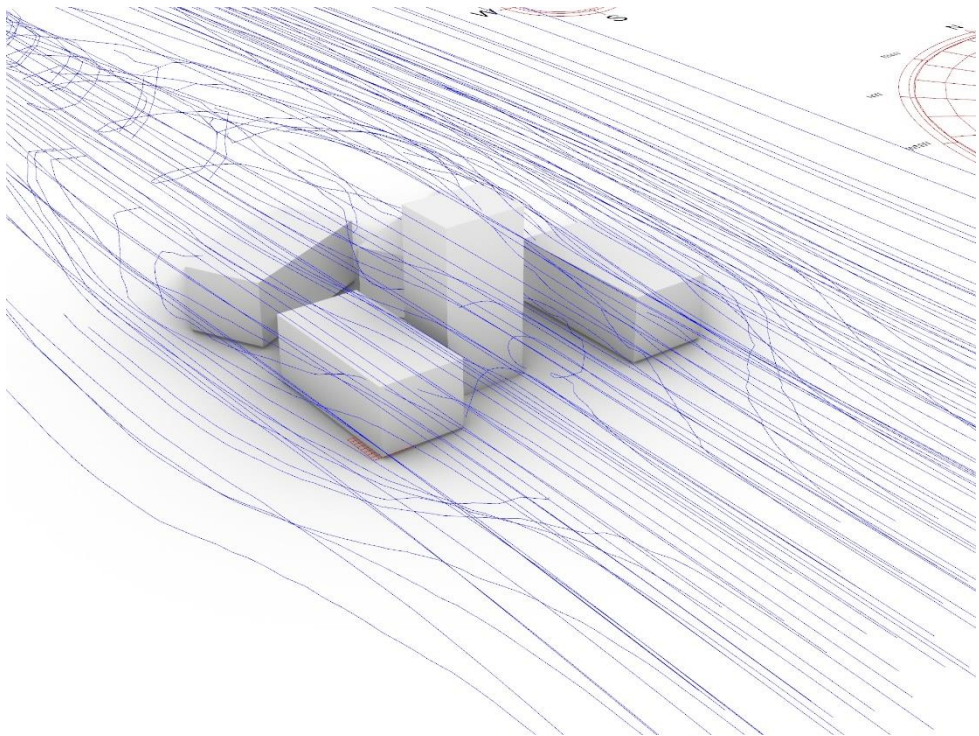
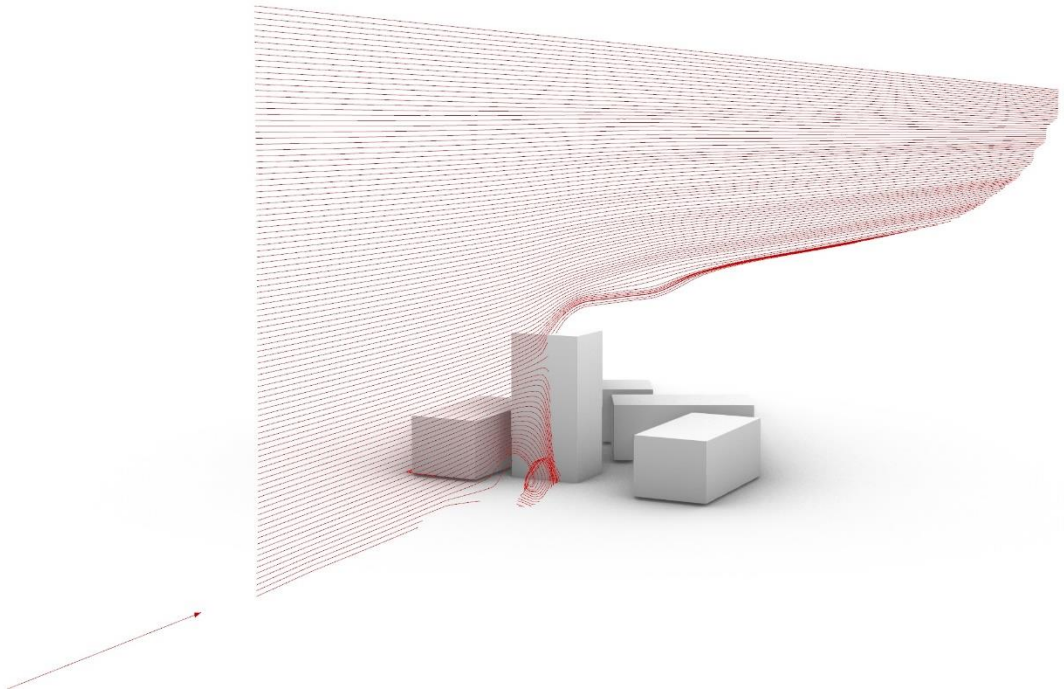
Wind Speed (m/s)
 city: Bruxelles Gare de l'Ouest
 country: Belgique
 time-zone: 1
 source: SRC-TMYx (modified)
 period: 1/1 to 12/31 between 1 and 14 @1
 Calm for 0.9% of the time = 46 hours.
 Each closed polyline shows frequency of 1.0% = 49 hours.



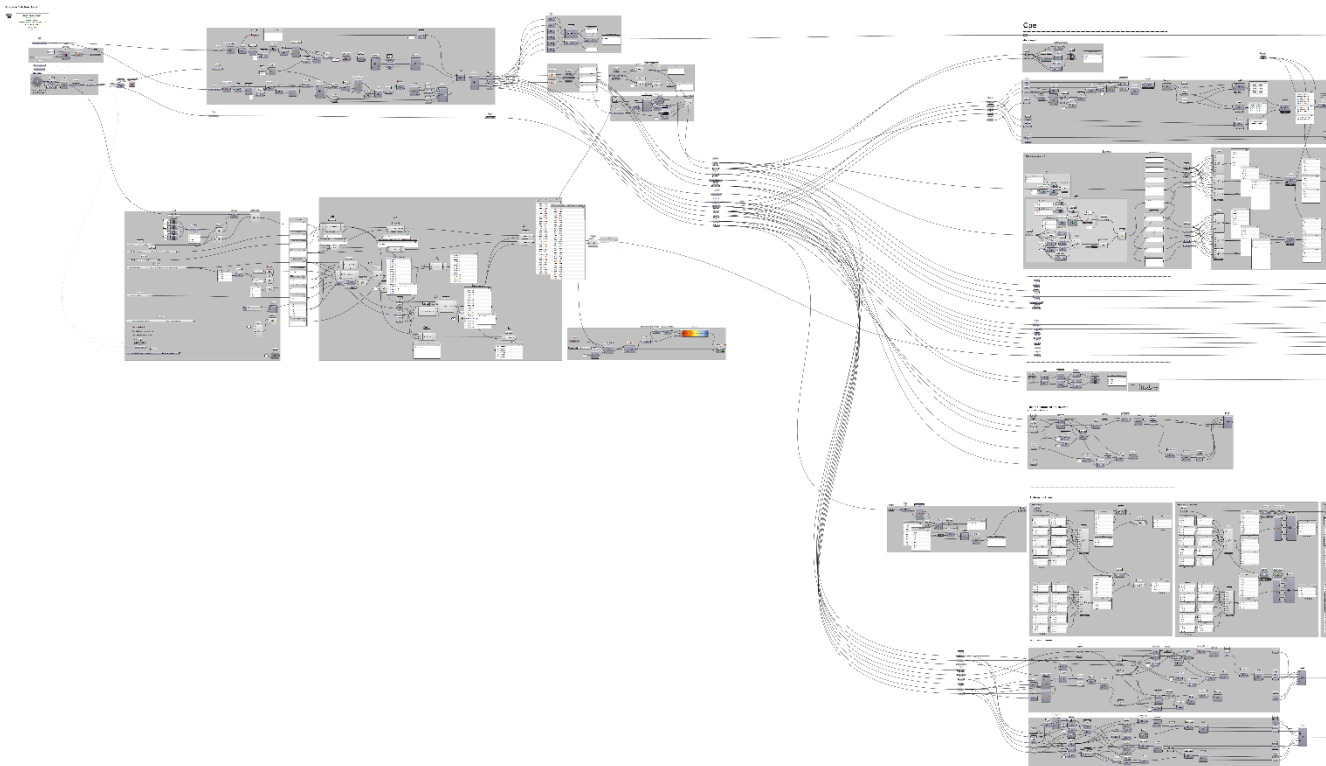
Simulation CFD

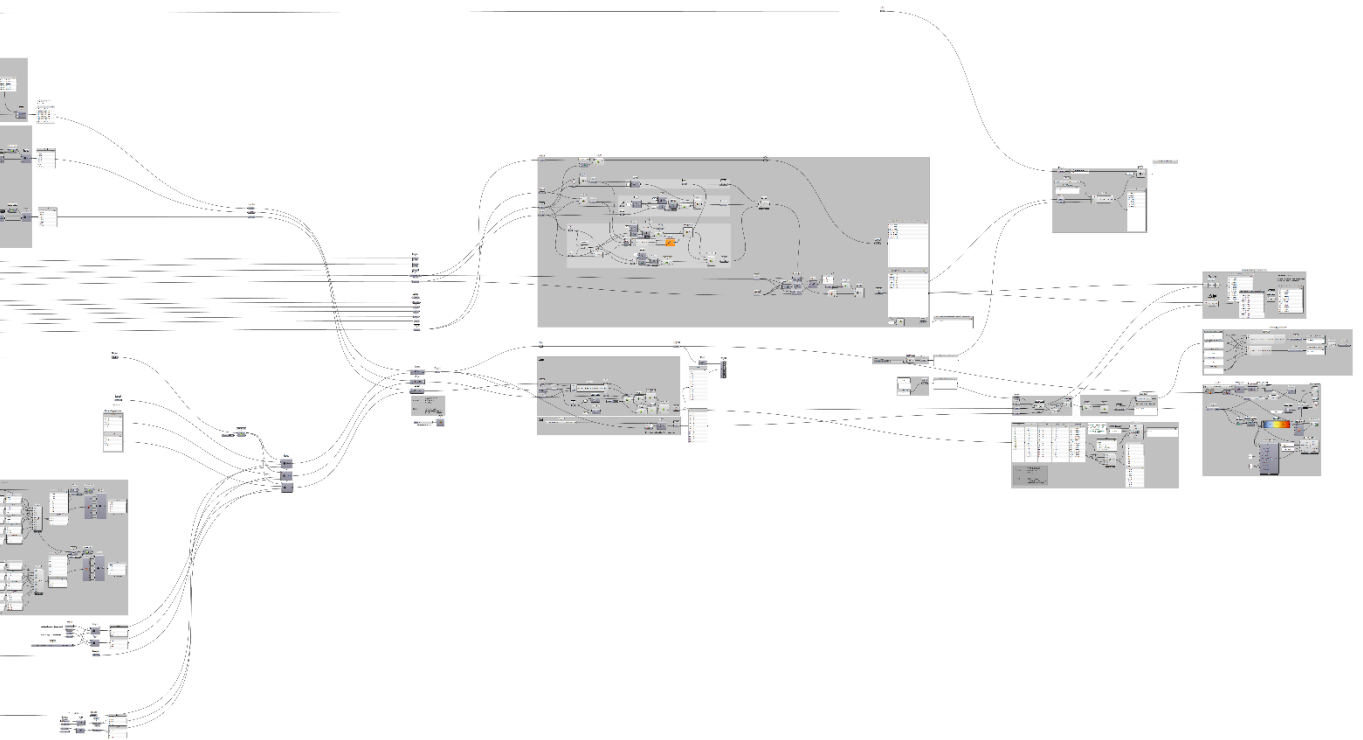




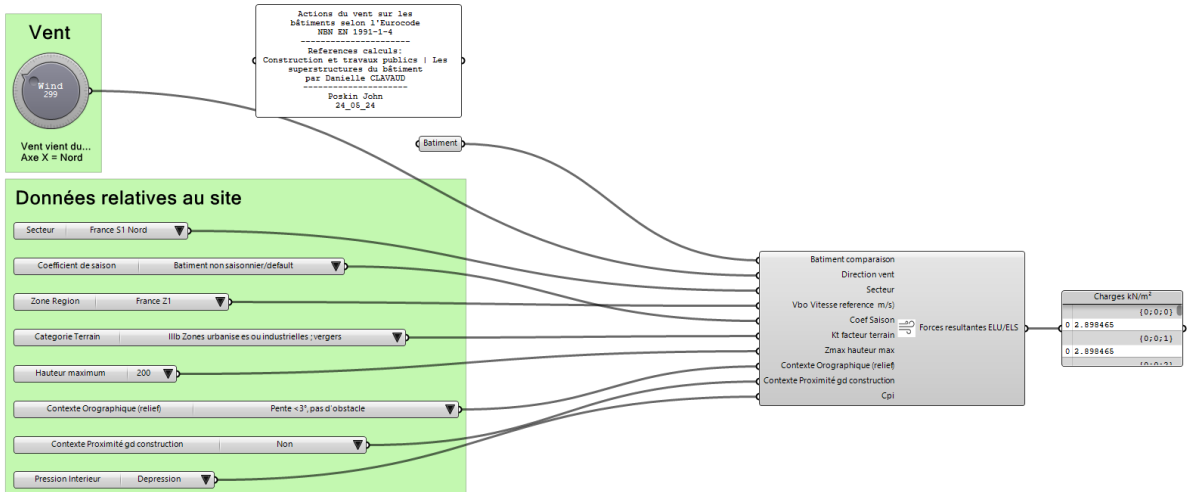
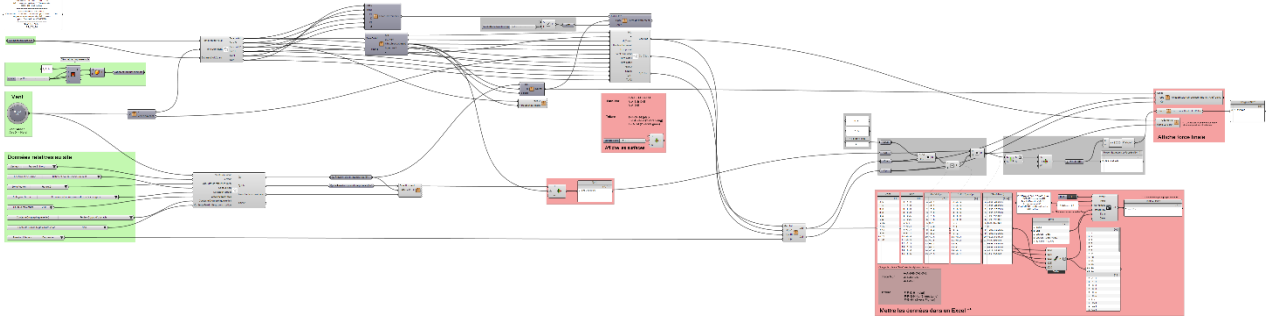


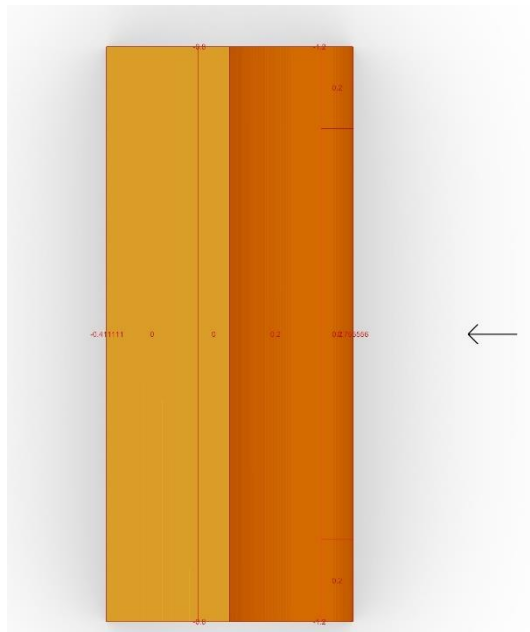
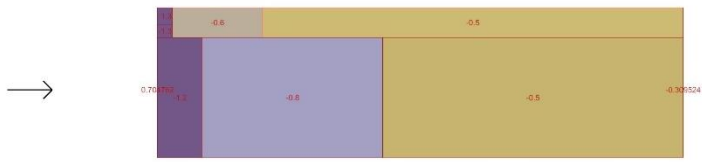
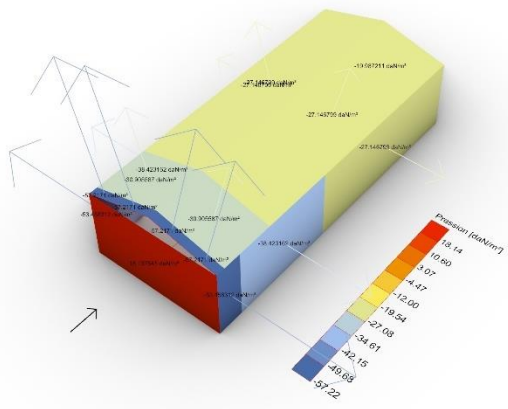
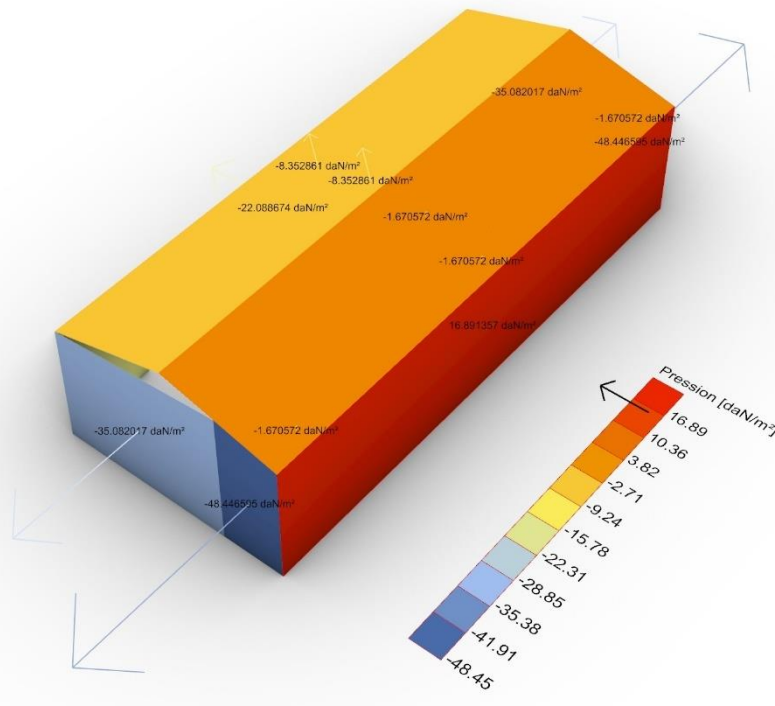
NBN Eurocode 1



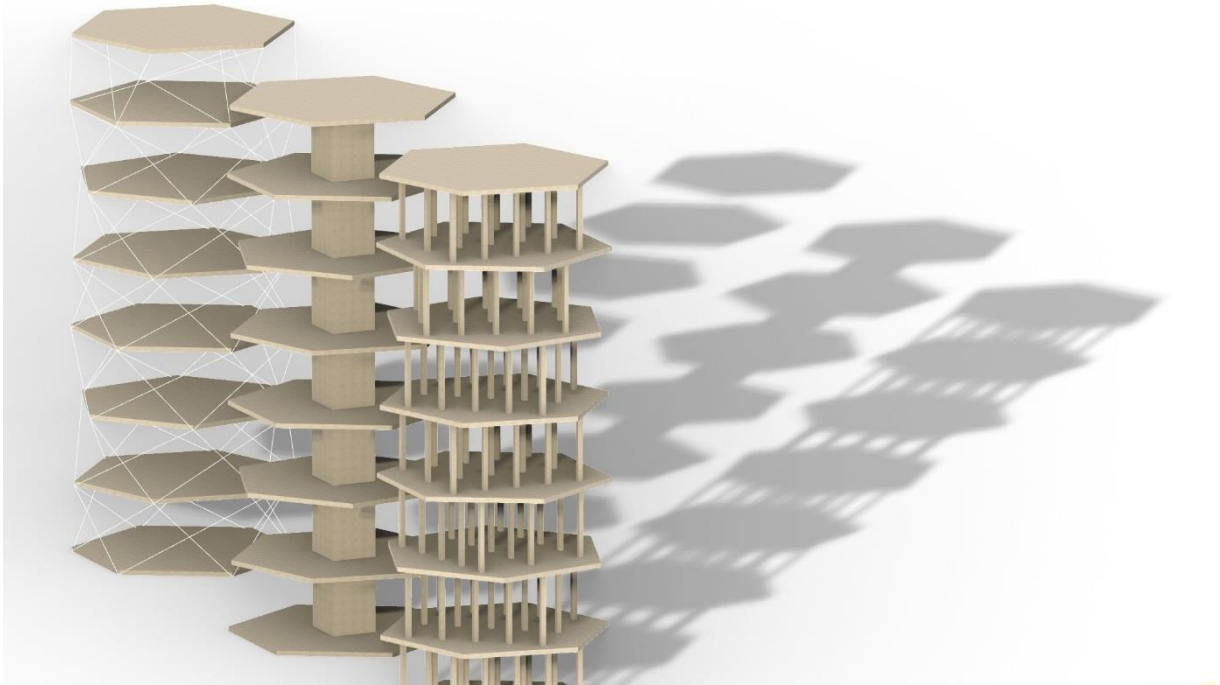
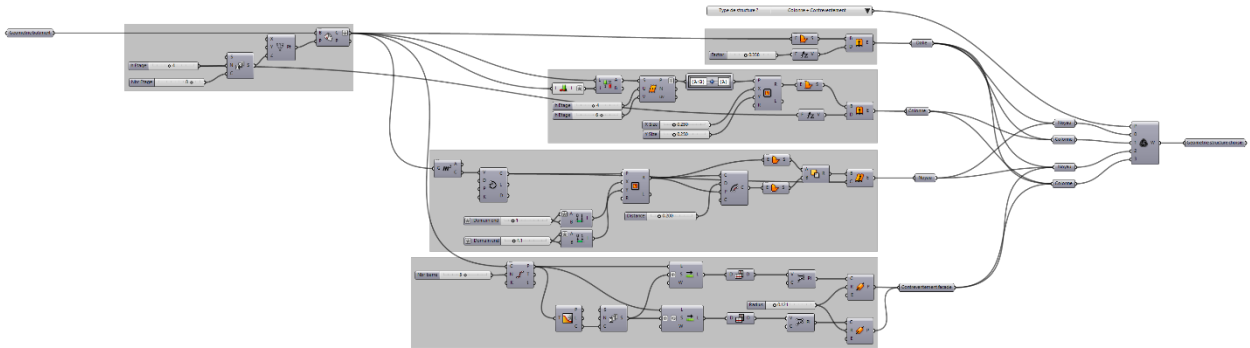


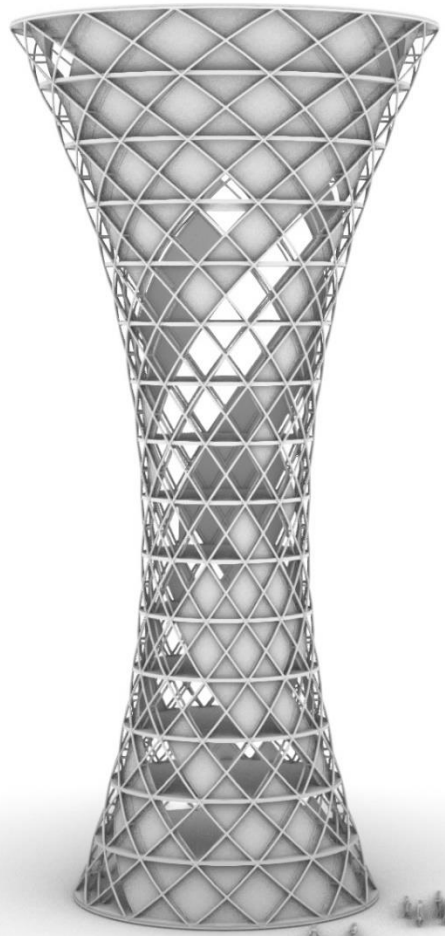
Eurocode 1 Action du vent





Style de structure





Tornado Tower Doha

