



# TRENDS IN DIGITALISERING

Rayaan Ajouz

## Wie ben ik

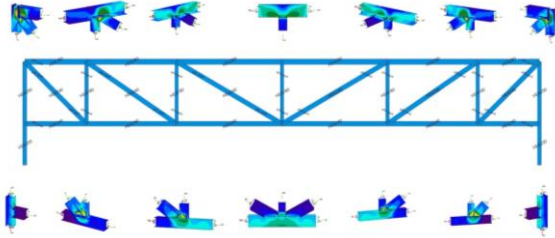
- Rayaan Ajouz
- TU Delft
  - BSc Architecture
  - MSc Civiele techniek Building Engineering
- Afgestudeerd dec 2018
- ABT bv
- Multi-discipline ingenieursbureau
- Constructeur utiliteitsbouw
- 4 d/w



- Bouwen met Staal
- Kennis instituut staalbouwindustrie
- Onderzoeker/promoter computational design
- 1 d/w

# Parametrisch Bouwen met Staal

## Research project SMARTconnection



SMART  
connection

## Webinar series

YouTube → Bouwen met staal + digital innovation



## Hackathon@Staalbouwdag



2019



2022

## Cursus Parametrisch ontwerpen



**SZS** Stahlbau Zentrum Schweiz  
Centre suisse de la construction métallique  
Centro svizzero per la costruzione in acciaio

- 1 Digitale innovatie #1 - Computational design met Dynamo, RFEM en Refinery.  
Bouwen met Staal - 180 overgenomen - 2 jaar geleden
- 2 Digitale innovatie #2 - Parametrisch ontwerpen - van klein naar groot  
Bouwen met Staal - 101 overgenomen - 2 jaar geleden
- 3 Digitale innovatie #3 - Digitaal van ontwerp tot oplevering  
Bouwen met Staal - 88 overgenomen - 2 jaar geleden
- 4 Digitale innovatie #4 - Parametrisch ontwerpen is geschikt voor iedereen!  
Bouwen met Staal - 305 overgenomen - 2 jaar geleden
- 5 Digitale innovatie #5 - Disrupting architecture  
Bouwen met Staal - 153 overgenomen - 2 jaar geleden
- 6 Digitale innovatie #6 - Stop reinventing the wheel  
Bouwen met Staal - 88 overgenomen - 2 jaar geleden
- 7 Digitale innovatie #7 - Is de constructeur van de toekomst ook een software-ontwikkelaar?  
Bouwen met Staal - 133 overgenomen - 1 jaar geleden
- 8 Digitale innovatie #8 - Architecture shapes performance  
Bouwen met Staal - 235 overgenomen - 1 jaar geleden
- 9 Digitale innovatie #9 - Exploring the design solution space  
Bouwen met Staal - 138 overgenomen - 1 jaar geleden
- 10 Digitale innovatie #10 - Complexe vormen van 3D geprint beton tot circular hardhout  
Bouwen met Staal - 120 overgenomen - 1 jaar geleden
- 11 Digitale innovatie #10 - Complexe vormen van 3D geprint beton tot circular hardhout  
Bouwen met Staal - 118 overgenomen - 1 jaar geleden
- 12 Digitale innovatie #11 - All in the AEC industry  
Bouwen met Staal - 138 overgenomen - 1 jaar geleden
- 13 Webinar Road to Smart Factory  
Bouwen met Staal - 152 overgenomen - 11 maanden geleden

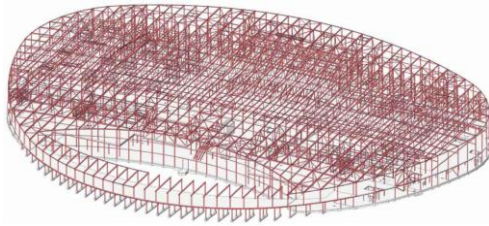
SMARTconnection 



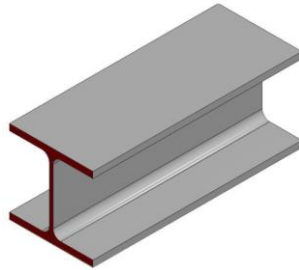
# Staalconstructie

Constructeur

Hoofddraagconstructie

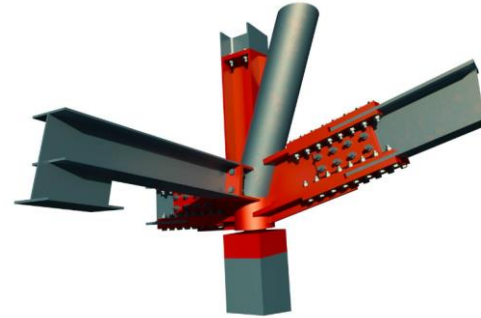


Balkafmetingen



Detail-engineer

Details

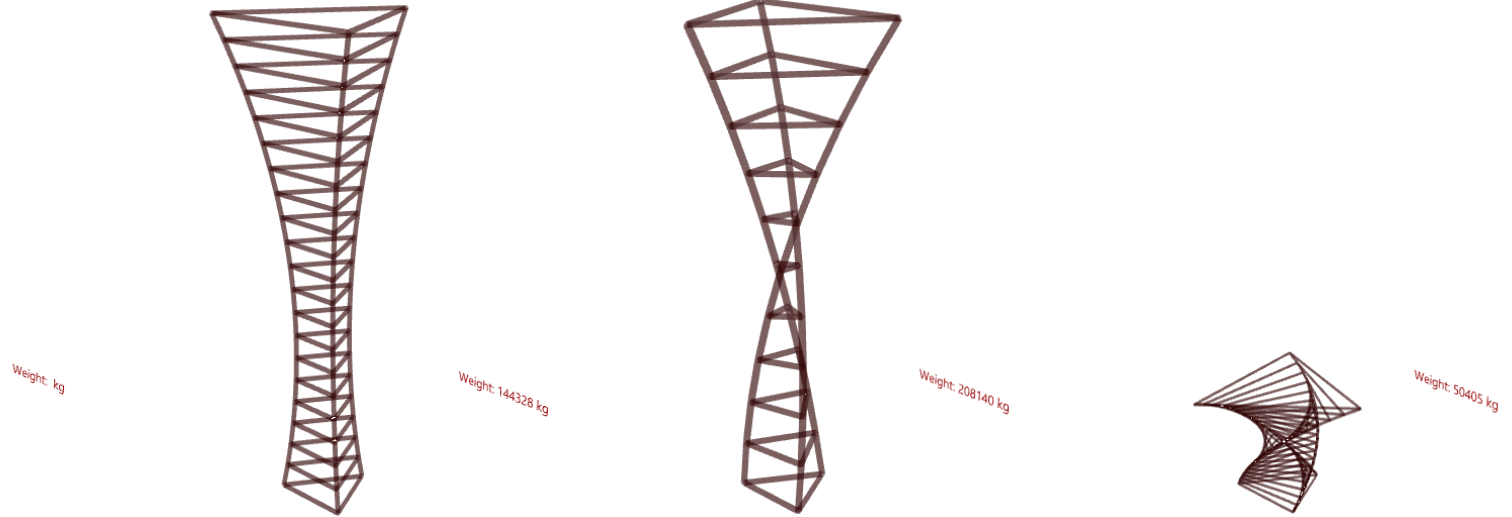


Tijdslijn

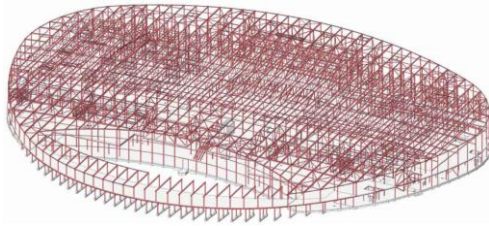




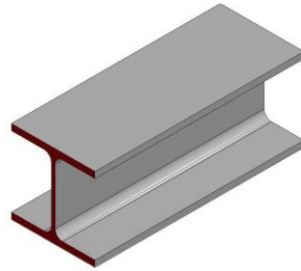
# Parametrisch ontwerpen en gewichtsoptimalisatie



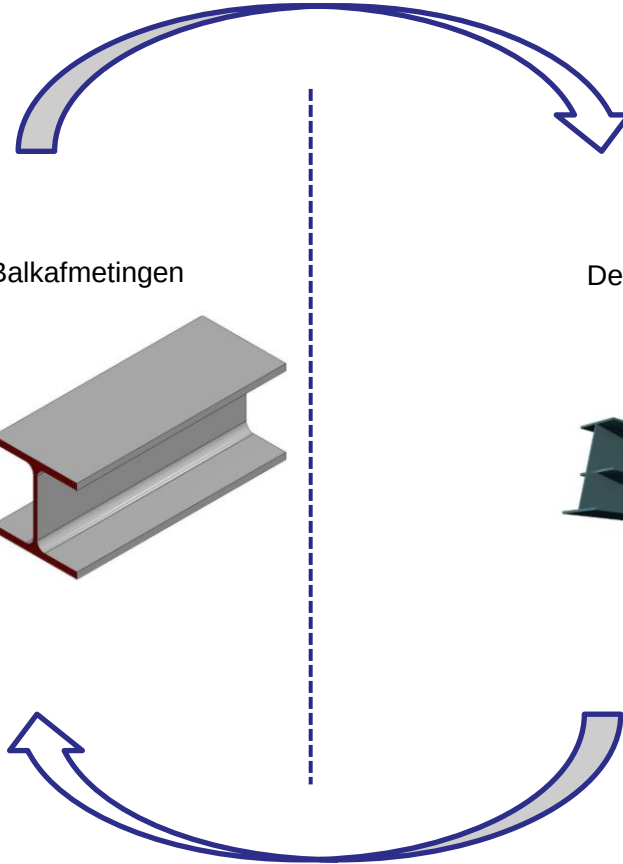
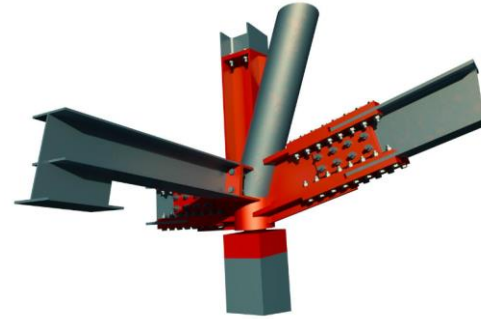
Hoofddraagconstructie



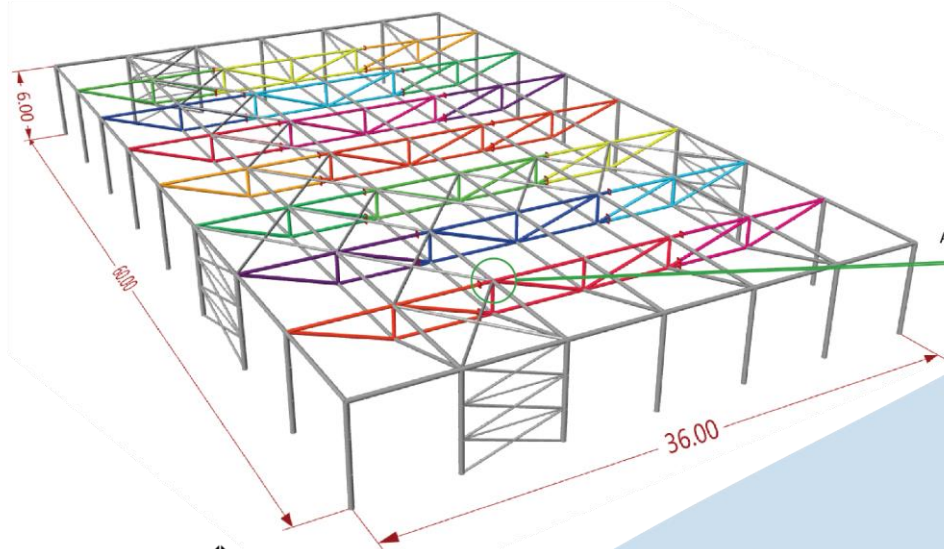
Balkafmetingen



Details

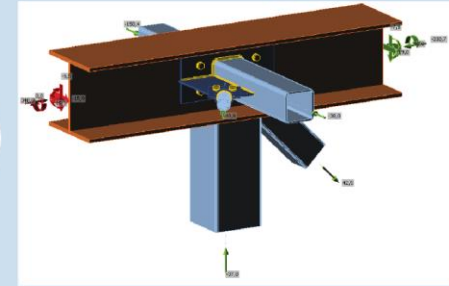


Structure model

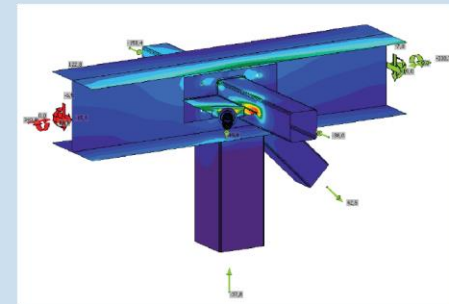


Joint model

Joint design



Calculate



Results

Check of results for extreme load effect (Plastic redistribution)

| Stations | Name       | Edge | Th (mm) | L (mm) | Loads | M <sub>Ed</sub> (kNm) | N <sub>Ed</sub> (kN) | V <sub>Ed</sub> (kN) | M <sub>Ed</sub> (kNm) | N <sub>Ed</sub> (kN) | V <sub>Ed</sub> (kN) | M <sub>Ed</sub> (kNm) | N <sub>Ed</sub> (kN) | V <sub>Ed</sub> (kN) |
|----------|------------|------|---------|--------|-------|-----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|
| 1        | CH-10-1-1  | 1    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 2        | CH-10-1-2  | 2    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 3        | CH-10-1-3  | 3    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 4        | CH-10-1-4  | 4    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 5        | CH-10-1-5  | 5    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 6        | CH-10-1-6  | 6    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 7        | CH-10-1-7  | 7    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 8        | CH-10-1-8  | 8    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 9        | CH-10-1-9  | 9    | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |
| 10       | CH-10-1-10 | 10   | 100     | 100    | 100   | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  | 100                   | 100                  | 100                  |

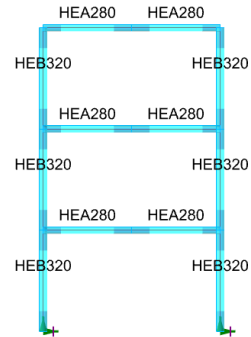
Cost model





# Kostenoptimalisatie

## Global model



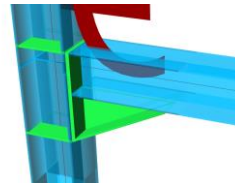
ux max: 48 mm  
uz max: -5 mm  
Beams: €3734,- (100.0%)  
Joints: €0,- (0.0%)  
Total: €3734,-

### Defined information

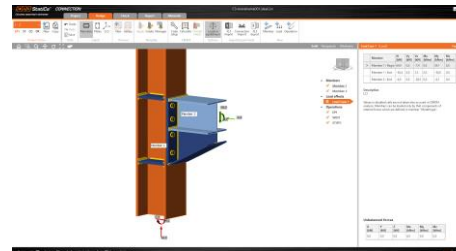
- Weight
- Surface
- Number of elements

## Local model

### Analytical



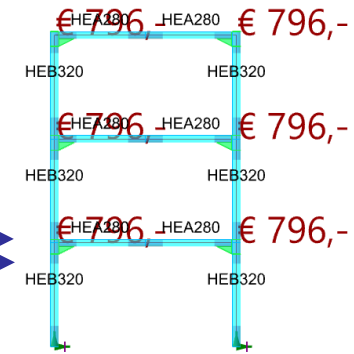
### IDEA StatiCa



### Defined information

- Weld volume
- Bolts
- Plates
- Sawing cuts

## Cost assessment

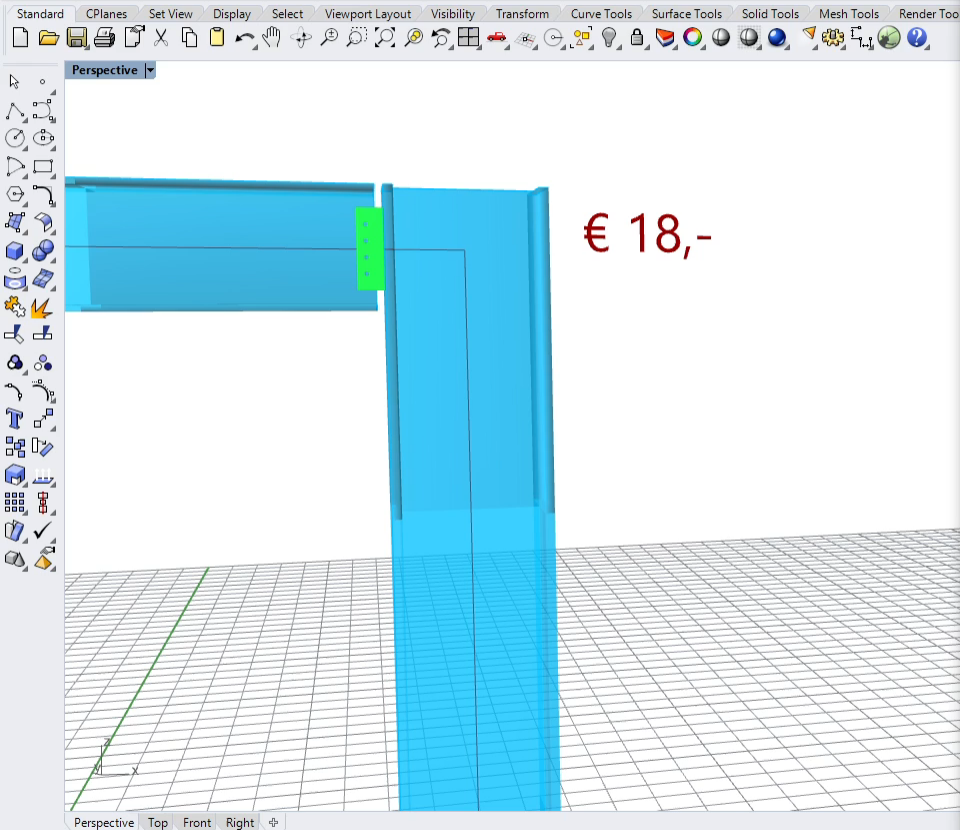


ux max: 56 mm  
uz max: -6 mm  
Beams: €3696,- (43.6%)  
Joints: €4774,- (56.4%)  
Total: €8470,-

### Defined information

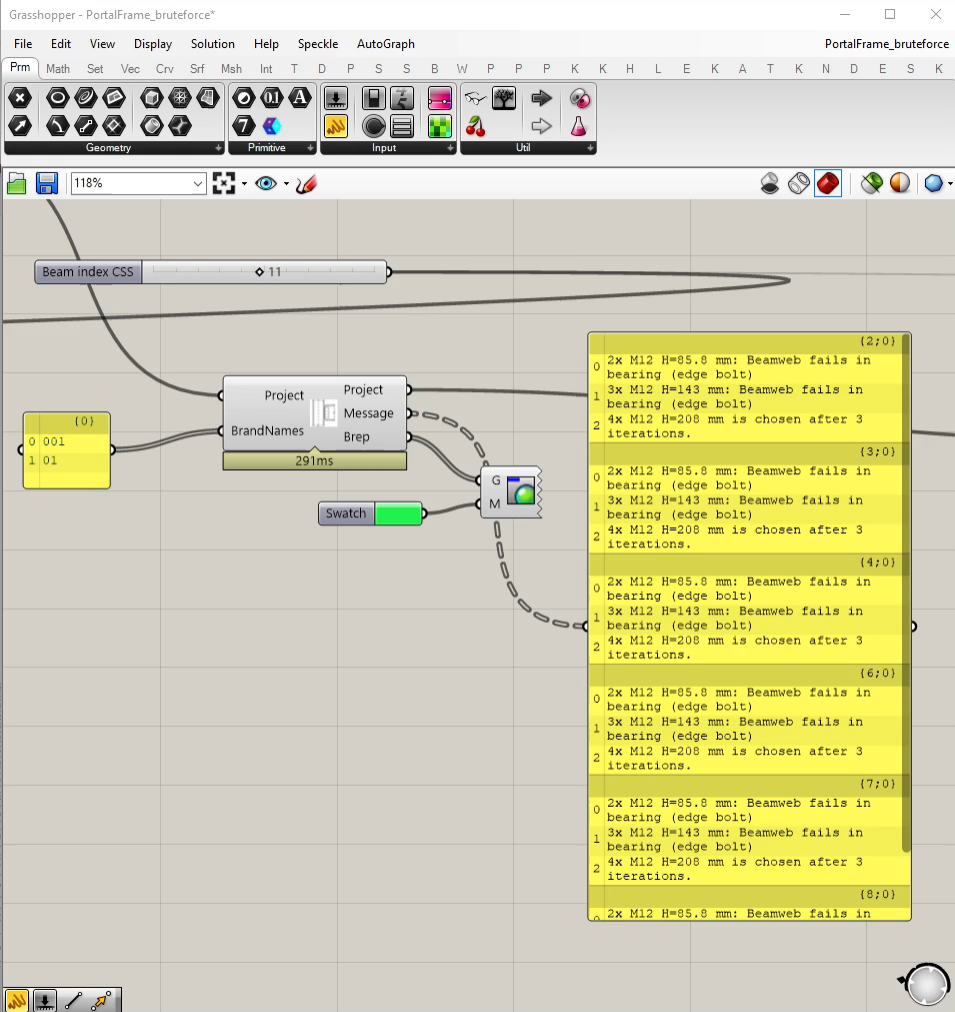
- Material price
- Welding price
- Price of bolts

Command:



☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☒ Knot ☐ Vertex ☐ Project ☐ Disable

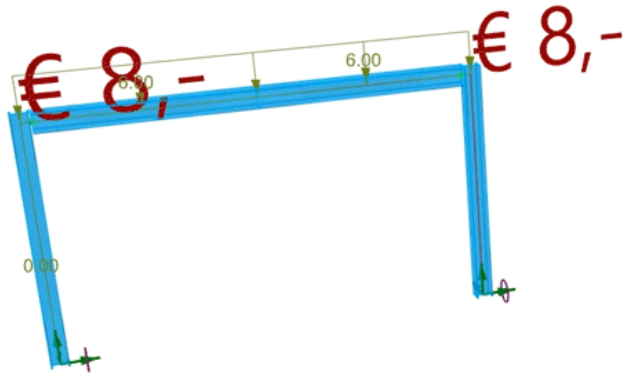
World x:-2.590 y:53.844 z:0.000 Millimeters Default Grid Snap Ortho Planar Osnap SmartTrack Gumball Record H Autosave complete (100 seconds ago)



1.0.007

14:17

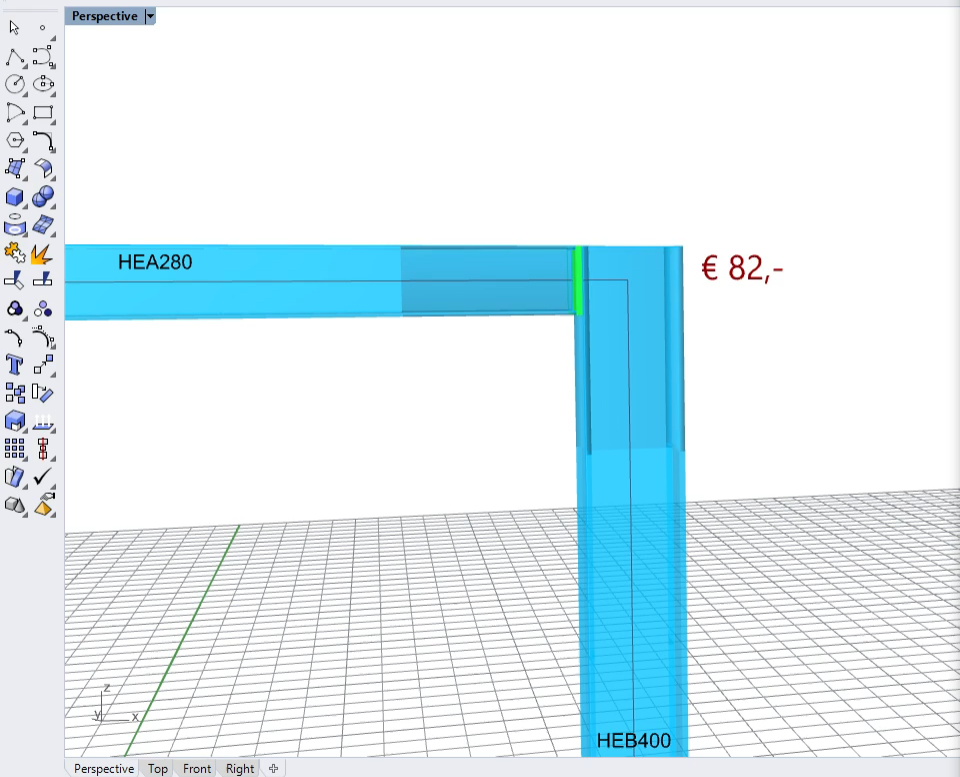
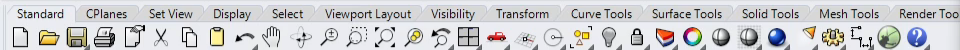
2-12-2020



Beams: €1210,- (98.8%)  
 Joints: €15,- (1.2%)  
 Total: €1224,-

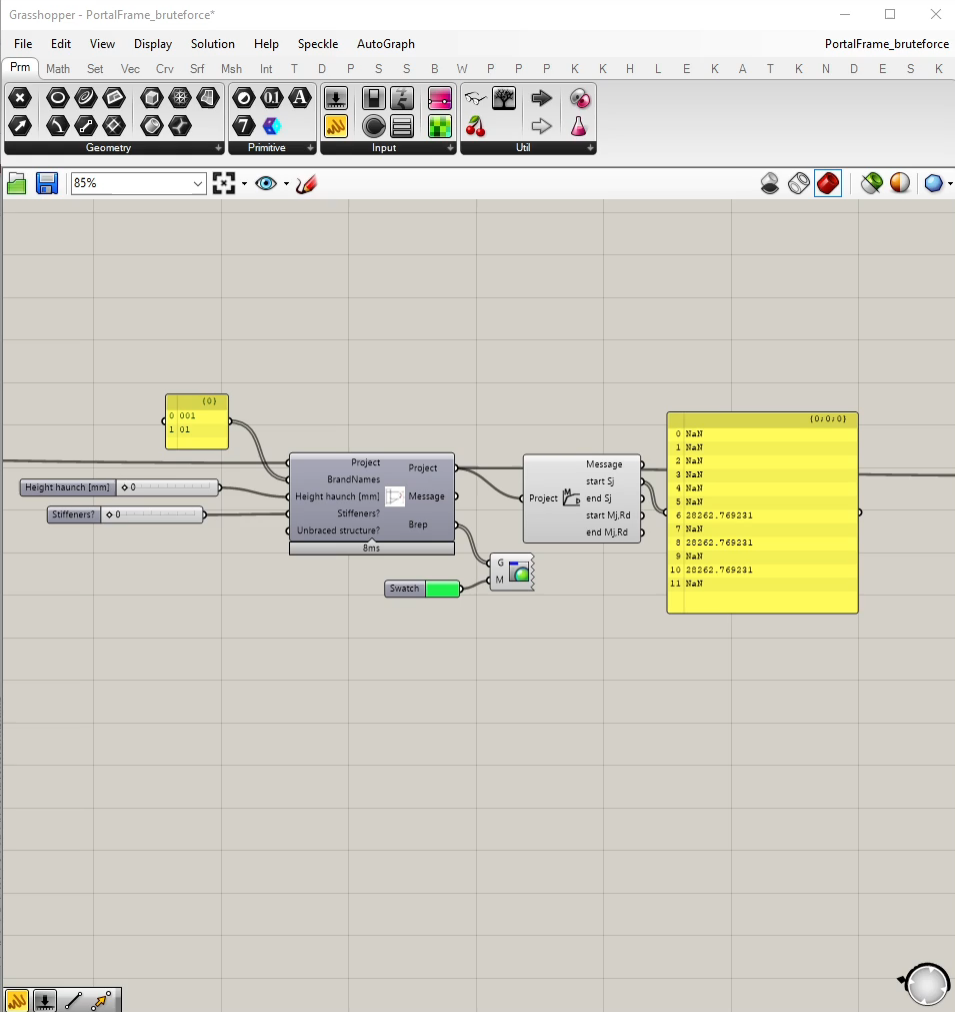


Command:



☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☐ Perp ☐ Tan ☐ Quad ☒ Knot ☐ Vertex ☐ Project ☐ Disable

World x: -3.233 y: 51.435 z: 0.000 Millimeters Default Grid Snap Ortho Planar Osnap SmartTrack Gumball Record H Autosave complete (3 seconds ago)



1.0.0007

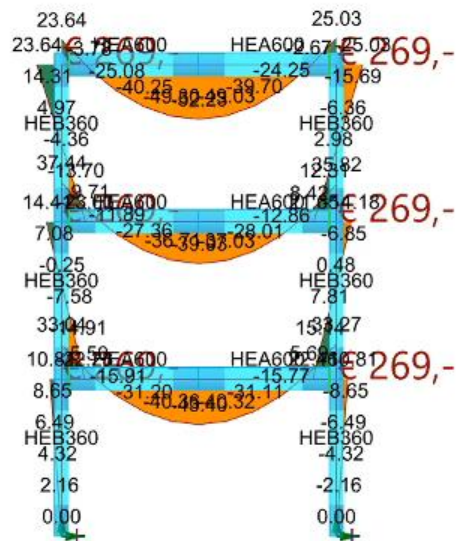
Command:

Standard CPlanes Set View Display Select Viewport Layout Visibility Transform Curve Tools Surface Tools Solid Tools Mesh Tools Render Tools Drafting New in V6



Top ▾

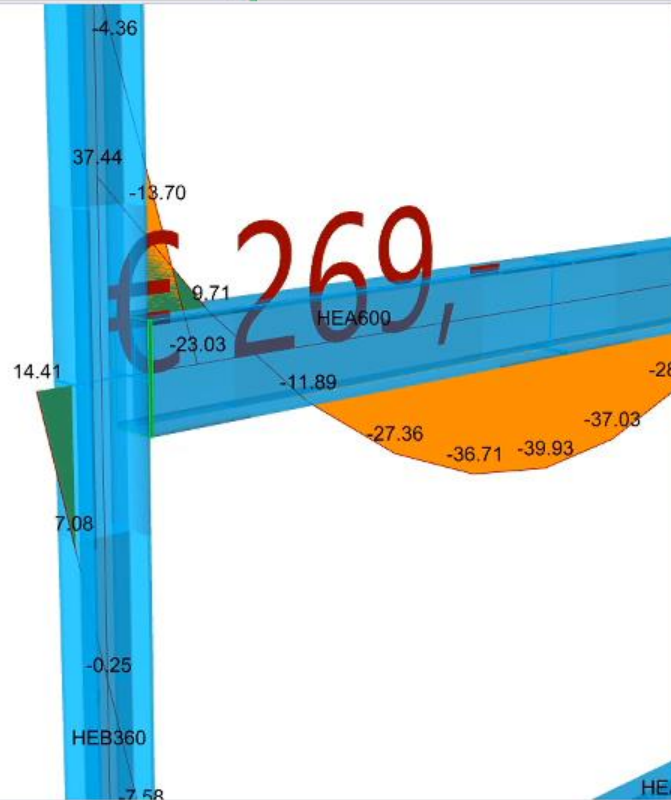
Front ▾



ux max: 2 mm  
uz max: -2 mm  
Beams: €6378,- (79.9%)  
Joints: €1609,- (20.1%)  
Total: €7987,-

Right ▾

Perspective ▾



Viewport

Title Front  
Width 846  
Height 795  
Projec... Parallel ▾  
Camera  
Lens L... 50.0  
Rotation 0.0  
X Loca... 5.31  
Y Loca... -117.628  
Z Loca... 5.502  
Distan... 117.628  
Locati... Place...

Target

X Target 5.31  
Y Target 0.0  
Z Target 5.502  
Locati... Place...

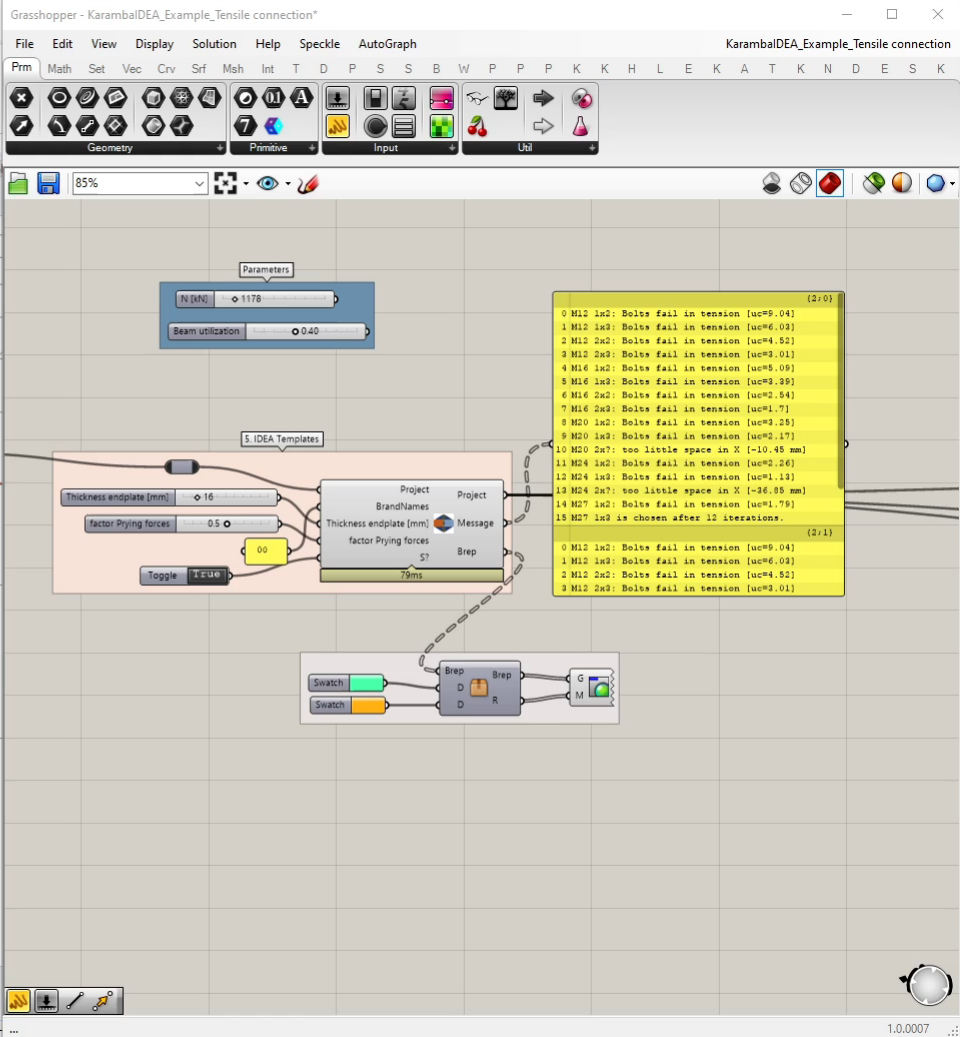
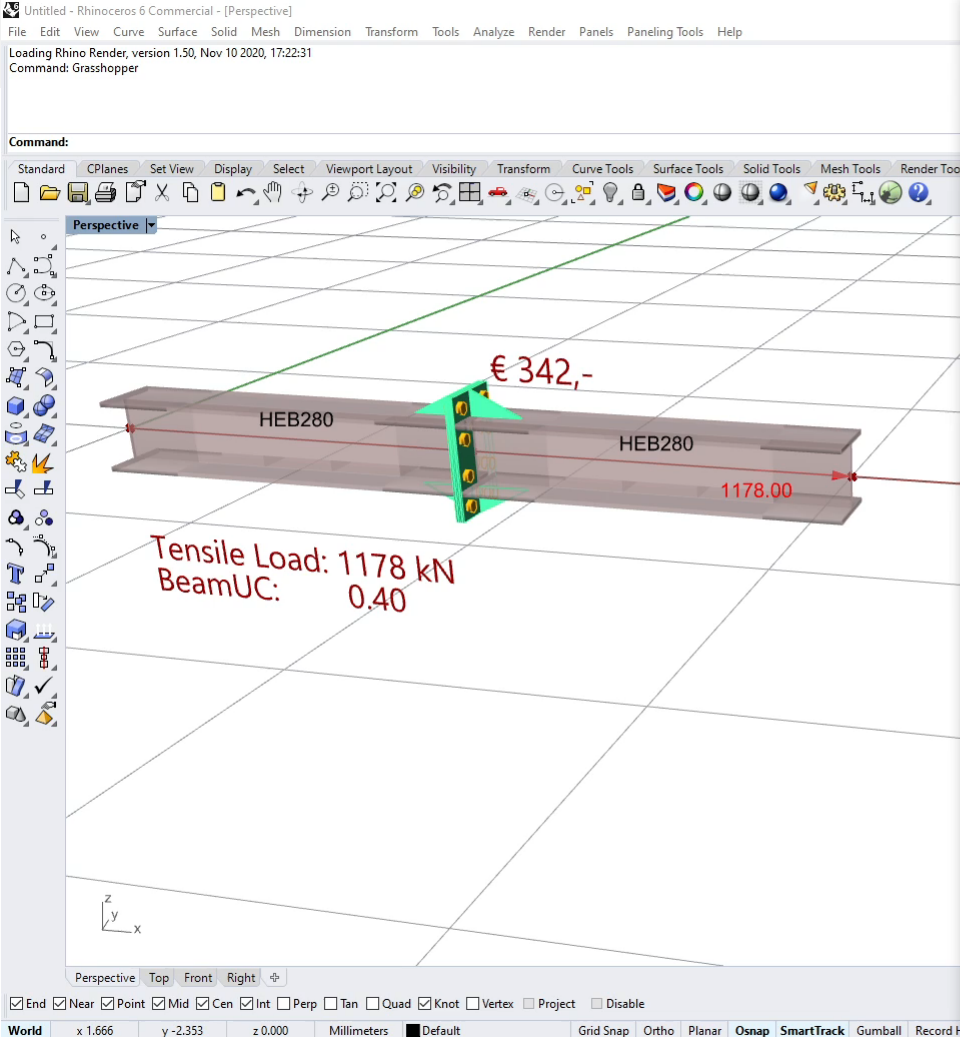
Wallpaper

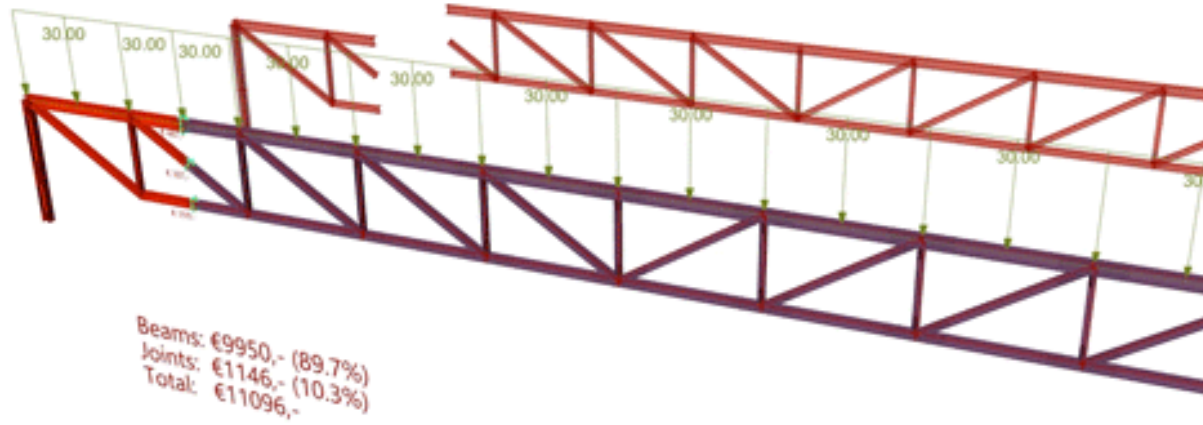
Filena... (none) ...  
Show ☒  
Gray ☒

Perspective Top Front Right ▾

☒ End ☒ Near ☒ Point ☒ Mid ☒ Cen ☒ Int ☒ Perp ☐ Tan ☐ Quad ☐ Knot ☐ Vertex ☐ Project ☐ Dissable

CPlane x -3.780 y 1.975 z 0.000 Millimeters Default Grid Snap Ortho Planar Osnap SmartTrack Gumball Record History Filter Available physical memory: 18534 MB







APPS SUPPORT FAQ

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## KARAMBAIDEA (by BouwenmetStaal)



KarambaIDEA is an open-source Grasshopper plug-in that links Karamba3D with IDEA StatiCa connection. One of the joints from the modeled steel structure in Karamba3D can be imported into IDEA StatiCa Connection for further analysis, on a detail level.

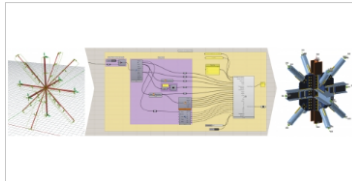
The plug-in KarambaIDEA is developed as part of the research project SMARTconnection. More information about the research project can be found at: <https://www.bouwenmetstaal.nl/themas/parametrisch-ontwerpen/smartconnection/>

### Software needed to run:

- IDEA StatiCa Connection 20.0
- Rhino 6
- Karamba3D (version 1.3.2)

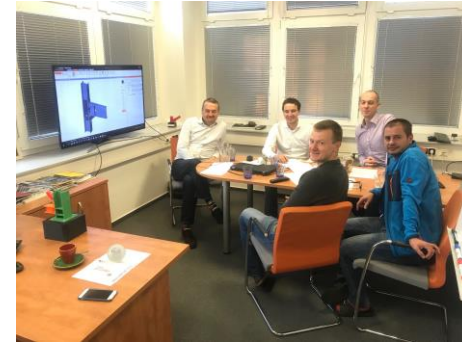
### Installation manual

Category: Structural Engineering  
License: Free



### Downloads

| Title                                    | Platform          | Description                                       |                          |
|------------------------------------------|-------------------|---------------------------------------------------|--------------------------|
| KarambaIDEA (Version 2.0)<br>2020-May-28 | Grasshopper Win 6 | Version 2.0 of Grasshopper Plug-in KarambaIDEA    | <a href="#">Download</a> |
| KarambaIDEA Examples                     | Grasshopper Win 6 | Example files that illustrate how KarambaIDEA can | <a href="#">Download</a> |



**IDEA StatiCa CONNECTION** untitled

Calculate yesterday in 4 minutes

Project Design Check Report Materials

CON1 EPS ST CD DR New Copy Undo Redo Save Members Plates LCS New Apply Plates Gallery Overall check Settings Loads in equilibrium Loads - percentage XLS Import Connection Import XLS Export Member Load Operation

Project items Data Labels Pictures Wireframe

Production cost = 48 €

1344.1 633.2 1291.0

Members

- ✓ C
- ✓ B

Load effects

- ✓ LE1

Operations

- ✓ CUT1
- ✓ CUT2
- ✓ STIFF1
- ✓ STIFF2

| Member    | N [%] | Vy [%] | Vz [%] | Mx [%] | My [%] | Mz [%] |
|-----------|-------|--------|--------|--------|--------|--------|
| > B / End | 50.0  | 0.0    | -20.0  | 0.0    | 45.0   | 0.0    |

Values in disabled cells are not taken into account in CBFEM analysis due to selected "Model type", missing cross-sectional characteristics, and unknown warping constraints.

Design code: EN Analysis: Stress, strain Load effects: Equilibrium not required Units: mm

www.ideastatica.com

# TRENDS IN DIGITALISERING

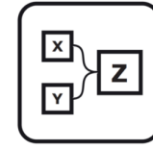




Drawings



Information



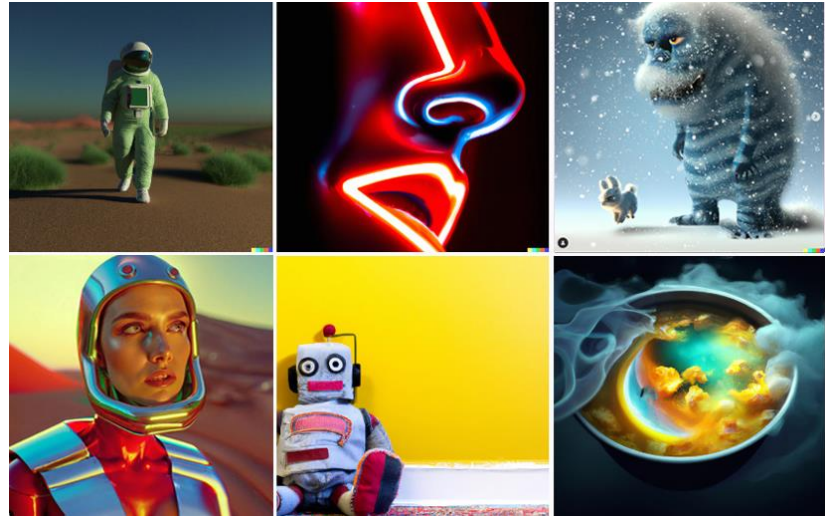
Logic



Intelligence



## Midjourney



**Andrey Tymoshenko** • 2e  
Founder at Live Animations • AR/VR loyalty Programs • Innova...  
4 mind • 1

+ Volgen ...

AI+van Gogh/Monet/Munch/Hocks

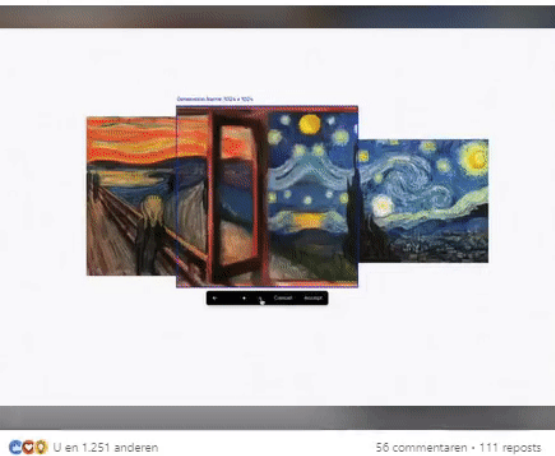
The sample, made by Orb Amsterdam is using dalle2 to mix and merge famous paintings together, creating a completely new canvas landscape.

Thanks for sharing **Roman Emig**

Click "Follow" for more latest insights on **#AR & #Innovation: Andrey Tymoshenko**

**#LiveAnimations #technology #ArtificialIntelligence #AI #art #artist #immersive #performance**

Vertaling weergeven



**JJ Delgado** • 2e  
9-figure Digital Businesses Maker based on Web2 & Web3 tec...  
1 w • 1

+ Volgen ...

Get this: Adobe's cranked up their creativity game and are unleashing the power of AI right into Photoshop! 🤖🔥

What's the fuss about? Firefly, their homegrown generative AI model, is now part of Photoshop. 🧐 This is not just a teeny update; it's a massive leap to inject AI into the creative process across the board.

And here's the coolest part, the Generative Fill feature! Now, you can literally ask Photoshop to fill in your image - add, remove, or even extend objects with simple text commands. It's like having your very own genie at your fingertips, granting your every creative wish. 🪄

Imagine this: Your project is due tomorrow, and you've got a gazillion edits left. No sweat! Generative Fill automatically aligns the perspective, lighting, style, you name it. The best part? It boosts your creative confidence, cuts down on time, and gets your ideas on the screen faster than ever.

Generative Fill is rolling out in the second half of 2023 but it's available in the desktop beta app and the Firefly beta app today. 📺🔥

The future of creativity is here, and it's powered by AI 🪄 <https://lnkd.in/dEbzmJqN>

Be one step ahead and learn one AI tool a day at [www.wildtools.ai](http://www.wildtools.ai)

**#AlInAdobe #PhotoshopFirefly #AIRRevolution #AdobeGenerativeFill #CreativityUnleashed**

Vertaling weergeven



**Steve Nouri** • 2e  
Chief AI Evangelist | Founder | 1MM+ Followers | Keynote Spe...  
1 w • Bewerkt • 1

+ Volgen ...

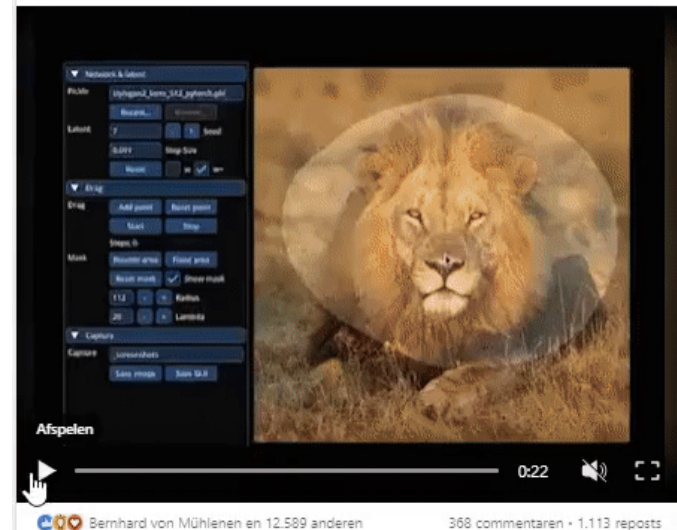
Photo manipulation at an unbelievable Godly level. 🤖🔥

If you drag the part you want to change, GAN will generate the new view instantly! This is the future of any photo manipulation app including Photoshop.

Drag Your GAN: Interactive Point-based Manipulation on the Generative Image Manifold

Paper: <https://lnkd.in/gV4nxJGk>

Vertaling weergeven



Fabio A. de Agostini • 2e  
Architect | Consultant | BIM expert | Revit hardcore | Naviswor...  
1 w • 1

+ Volgen ...

WHAAAT??

lucas feussner • 2e  
In the adidas web /// studio / Lead of Comms and activation  
1 w • 1

+ Volgen

AI meets Game development

This is insane!

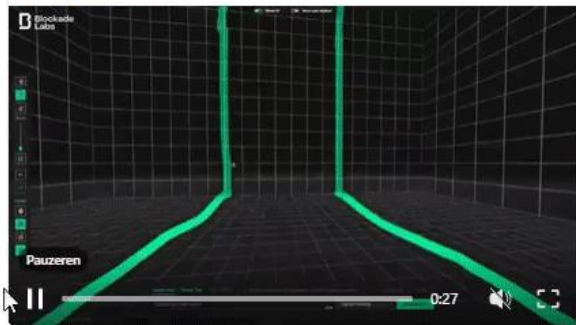
Blockade Labs introduces its Sketch to environment AI image generator.

Where anyone can bring to life 360° worlds with a simple sketch and a text prompt.

Making world creation accessible and easy for beginners to express their creativity via a simple drawing.

Excited to see more use-cases for this in the future.

Vertaling weergeven



Stefano Rossi en 82 anderen

4 commentaren

Lin (Leo) Meng • 2e  
Computational Design @ HDR | PhD Candidate @ UNSW  
4 mnd • 1

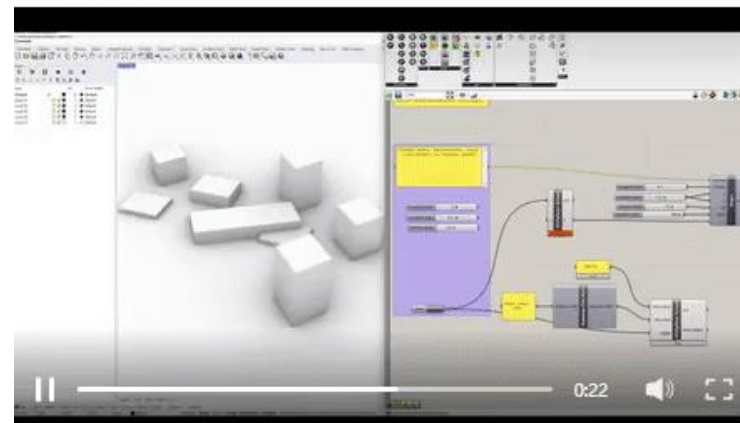
+ Volgen ...

The following paragraph in quotes is generated using ChatGPT with my comments in brackets:

"Check out my latest AIGC exploration using Stable Diffusion and Rhino Hops! I was able to generate some truly stunning (not true) and unique images from a simple Rhino model. Whether you're looking for realism or imagination, this technique is a must-try for any 3D artist (or architect). Check out the video clip to see it in action! #AIGC #RhinoHops #StableDiffusion #3DArt #CGI"

Hopefully, I can automate at least 12.5% of my life by 2023.

Vertaling weergeven



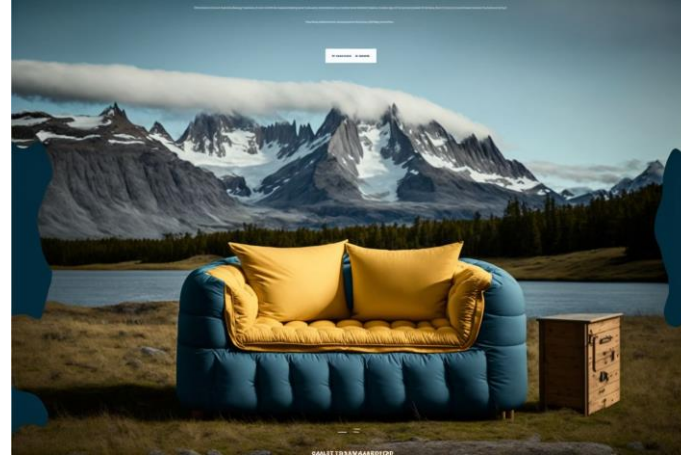
U en 379 anderen

8 commentaren • 21 reposts



Bron: Eric Groza





Bron: Eric Groza

<https://youtu.be/Q5vGgJm2aVI>





# CHATGPT VOOR DE CONSTRUCTEUR

Doğukan Karataş • 2e  
AEC Software Developer | Structural and Earthquake Engineer | Co...  
1 mnd • 6

AI Assistant for Structural Analysis with GPT

The screenshot displays a software interface for structural analysis. On the left, a 3D model of a blue cylindrical tank is shown on a grid. Below the model, a table lists material properties:

| Material No. | Material Name | Material Type | Material Model             | Modulus of Elast. E (N/mm²) |
|--------------|---------------|---------------|----------------------------|-----------------------------|
| 1            | S235          | Steel         | Isotropic / Linear Elastic | 210000.0                    |
| 2            |               |               |                            |                             |
| 3            |               |               |                            |                             |
| 4            |               |               |                            |                             |
| 5            |               |               |                            |                             |
| 6            |               |               |                            |                             |
| 7            |               |               |                            |                             |
| 8            |               |               |                            |                             |

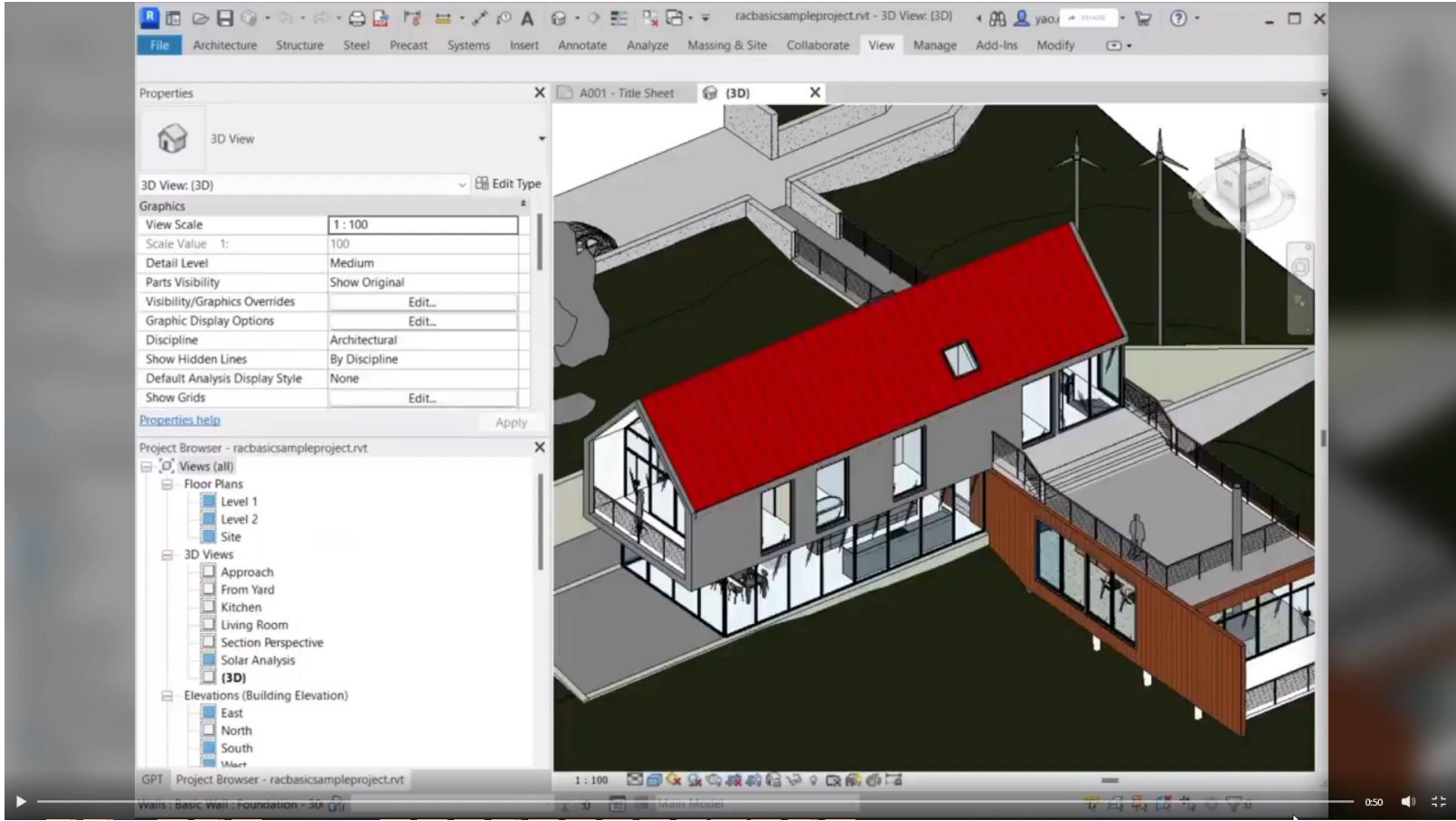
On the right, a web browser window shows the "RFEM6 GPT Assistant" interface. It features the logos for "Dlubal" and "OpenAI". The main heading is "RFEM6 GPT Assistant". Below it, a text input field contains the command: "Create a steel tank with a diameter of 16, height of 27 and the wall". A red "Go!" button is visible. The interface also shows status messages: "AI Assistant is working on it...", "Generator started...", and "Sending to RFEM...".

Yao Chen • 2e  
Product Manager at VIA Technik, LLC  
2 w •

+ Volgen ...

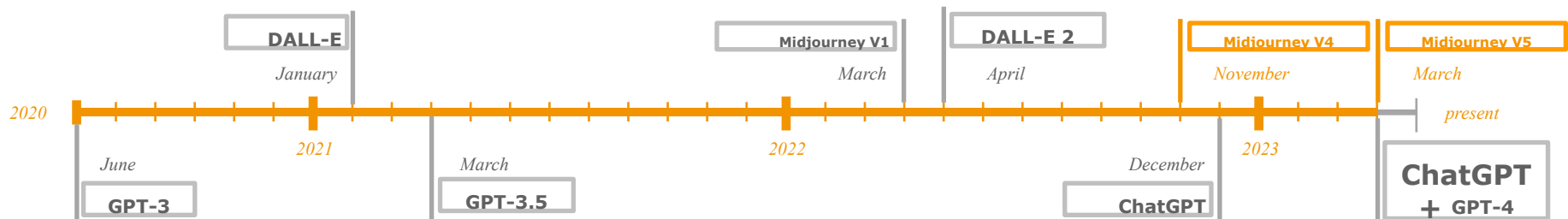
Check out this demo video to see how ChatGPT works seamlessly with Revit. With ChatGPT, you can now easily access Revit API and receive instant script responses that can run directly within Revit.

#Revit #ChatGPT #RevitGPT



# A brief recent history

## Midjourney V5



**WAT VALT OP?**



# Ontwerpen in de stedenbouwkundige context

**Rob Asher** • 2e  
CEO at Giraffe Technology - We're hiring!  
1 mind • 0

+ Volgen ...

Giraffe is designed to be as dynamic and efficient as possible. More design options can be explored. This means better design.

But at a certain point exploration ceases. The design must be frozen and communicated as clearly as possible.

Nothing is simpler than pdf.

Our pdf report builder is seeking to balance re-usability, speed and flexibility.

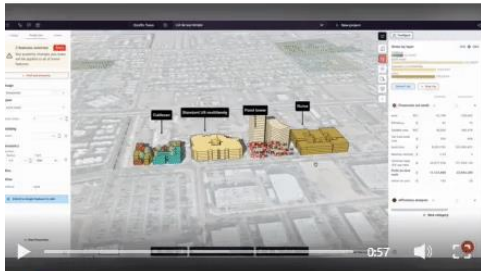
It is not going to win you a graphic design award.

But it will create elegant, clear reports directly from the Giraffe model, views and calculations you have already set up. And it will do it "fast".

The video shows me designing and laying out a report in less than a minute.

(You can stop worrying about whether you copy pasted the most up to date numbers into your report.)

**Vertaling weergeven**



Carlos Pérez Albá en 88 anderen

7 commentaren • 1 repost

**OMRT**  
4.720 volgers  
5 mind • 0

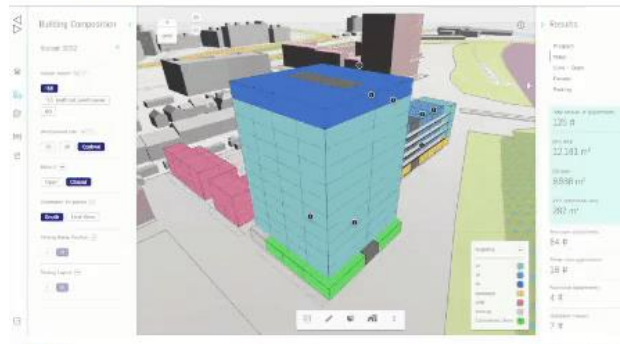
What the hell is a digital twin? 🤖

At OMRT we are all about **#FutureTwinning**. But the concept of the **#digitaltwin** has really gone big in the past year. Click here to learn more about what it is (OMRTstyle): <https://lnkd.in/eePpzdTZ>

If you want to know more about what's going on with technology and innovation in construction (just like this) we are launching our brand new **#Osprey** newsletter in 2023

**#innovation #tech #parametricdesign**

**Vertaling weergeven**



59

2 commentaren

## AUTODESK Forma

**Michal Gula** • 2e  
3D and AI Voice with 33K+ follows | "...Because 2D is against..."  
2 w • 0

+ Volgen ...

Do you like when other people are watching you having sex?  
Just yesterday I was driving through our capital city and saw 5 high modern towers full of apartments. They were just few tens of meters from each other.

My friend said that last week there was this video from those buildings where one person filmed and released a video of other people "going nuts".

So there are basically 2 solutions for that.

1. Use curtains you lucky bastards 🍷
2. Architect should be thinking also about privacy, views, shadows etc.

And this cool solution from Autodesk called **Spacemaker AI** can help with it.

It can perform all those analysis and help architects design project as optimal as possible.

Follow me for more 3D and AI content on Michal Gula

**#3d #architecture #artificialintelligence #bim #urbanplanning**

**Vertaling weergeven**



Omar Piccoli Cappelli en 169 anderen

10 commentaren • 12 reposts

# Constructie grid en materiaal optimalisatie

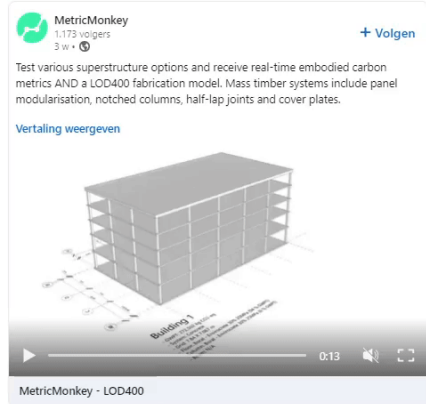
**Paul Wintour** • 1e  
Parametric & BIM specialist, founder of Parametric Monkey  
3 w • 0

Level of Development (LOD). Much ink has been spilled about its meaning, not to mention endless matrices describing which parties need to model which elements and to which level of detail. With MetricMonkey, we're embedding LOD directly into each and every element. This means you can quickly substitute out entire systems, such as mass timber instead of concrete, and then easily visualise the new system at the various LODs. Systemisation at scale.

This is BIM 2.0

<https://lnkd.in/gZw8EpG>

Vertaling weergeven



U en 89 anderen

3 commentaren

**Vlad Opanasiuk** CEng MStructE • 2e  
CEO @ REDD // Structural Engineering // Automation  
1 mind • 0

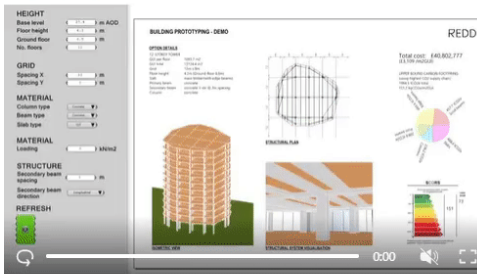
Happy to share a teaser video for a building sized like no other before. It sizes elements, gives instant quantities, cost and SCORS rating in seconds! Do you want this to become public?

- Features list to be added soon:
- Foundation sizing
  - Core and stability system
  - Façade systems
  - Atria and transfer systems
  - Location adjustment
  - Modular options

Give me a shout if you would like to collaborate and for feature ideas.

#buildingdesign #embodiedcarbon #scors #conceptdesign #construction #aec #aecindustry #digitalconstruction #structuralengineering #costestimation #co2

Vertaling weergeven



U en 71 anderen

33 commentaren • 1 repost

**ShapeDiver**  
3,331 volgers  
2 mind • 0

This online application, code-named 'Cactus', was created by **Dan Cole**, a Senior Structural Engineer at **Webb Yates Engineers**. It uses **Grasshopper3D** and **ShapeDiver** to render a full 3D parametric model of a building, undertake a preliminary structural design, and calculate the embodied carbon, all in approximately one second.

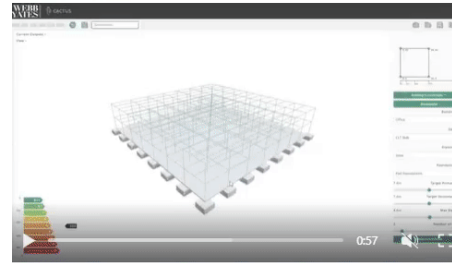
Recently, we interviewed Dan to learn more about his background, what sparked his interest in the AEC industry, and the benefits of using parametric design tools like Grasshopper as a Structural Engineer. He also shared more details about 'Cactus' and some of its secrets, such as using it to gather data from over 120,000 different simulated building designs.

Read the interview: <https://lnkd.in/dnXp3FR>

Overall, the interview provides insight into the importance of computational design in the AEC industry and how it can lead to more efficient and sustainable design.

#AEC #design #structuralengineering #Rhino3D #GH3D #computationaldesign

Vertaling weergeven



Cactus: Webb Yates Engineers in-house carbon counting tool.

**VIKTOR**  
8,822 volgers  
9 w • 0

Discover how engineering powerhouse Arcadis used #VIKTOR to develop a suite of #apps that automate the generation of #structural building designs and facilitate effortless worldwide collaboration.

The Building Structural Design tool allows engineers to enter basic information about the building dimensions and #sustainability requirements of a building and try different grid options to automatically calculate required element sizes for columns, beams, and floors.

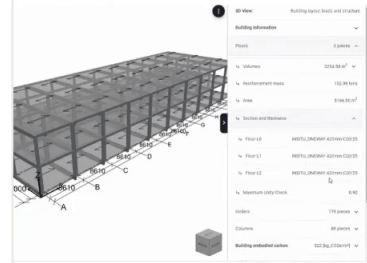
Igor Pecanac, Specialist Engineer at #Arcadis, emphasizes the remarkable #timesaving capabilities of the app: "The app automatically generates the structure for you. This would normally be done by a structural engineer themselves. Instead, the app does this in just 4 seconds."

Michael van Telgen, Design Automation Specialist, shares how seamless #collaboration was enabled in the #global firm through the app suite: "Thanks to our active group of stakeholders and end users all over the world, we have been able to make the application accessible to everyone working in the realm of structural engineering within Arcadis."

See how Arcadis is developing next-gen engineering tools: <https://lnkd.in/g6R9TFR>

#automation #structuralengineering #engineering #structuraldesign #webapp #python #collaboration

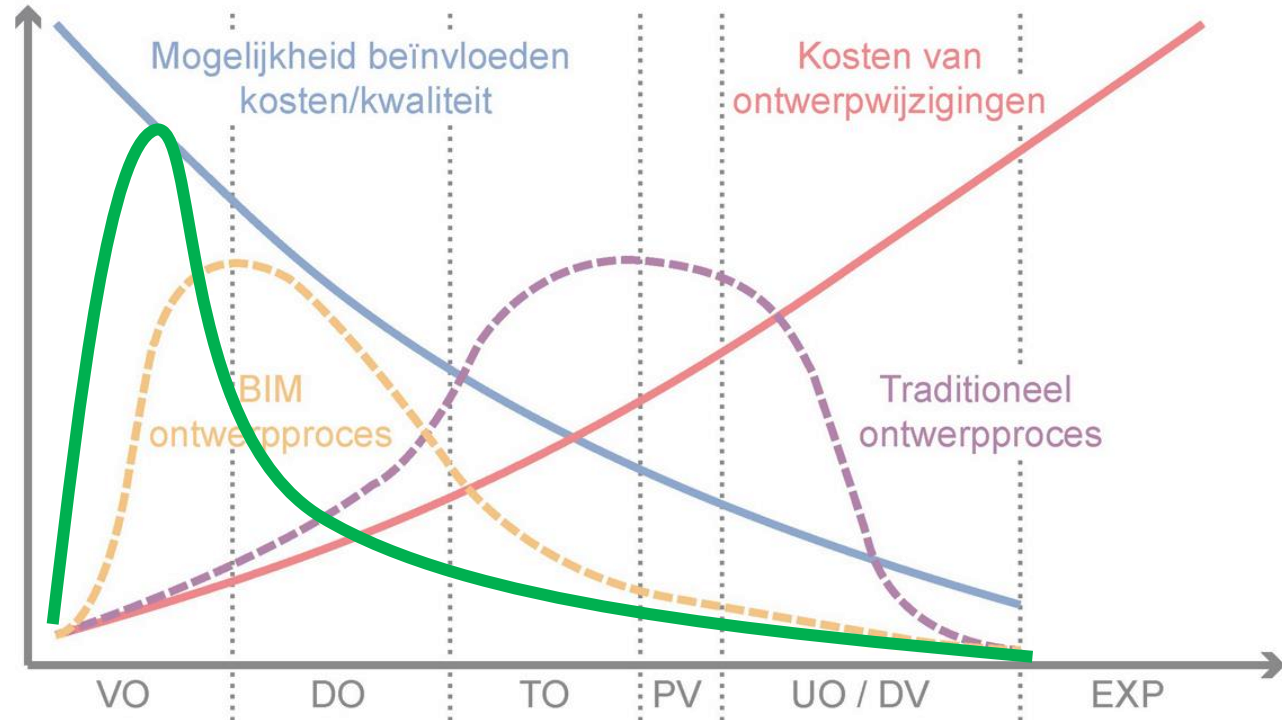
Vertaling weergeven



U en 44 anderen

3 commentaren

Computational design





Digital engineering

WindBASE



A photograph of a wind farm with four white wind turbines on a rolling green hill under a clear blue sky. The turbines have three blades each, with red and blue markings on the tips. The foreground is a vibrant green field, possibly rapeseed.

2800 windturbines geadviseerd

2600 MW opgesteld vermogen

360 alleenstaande turbines

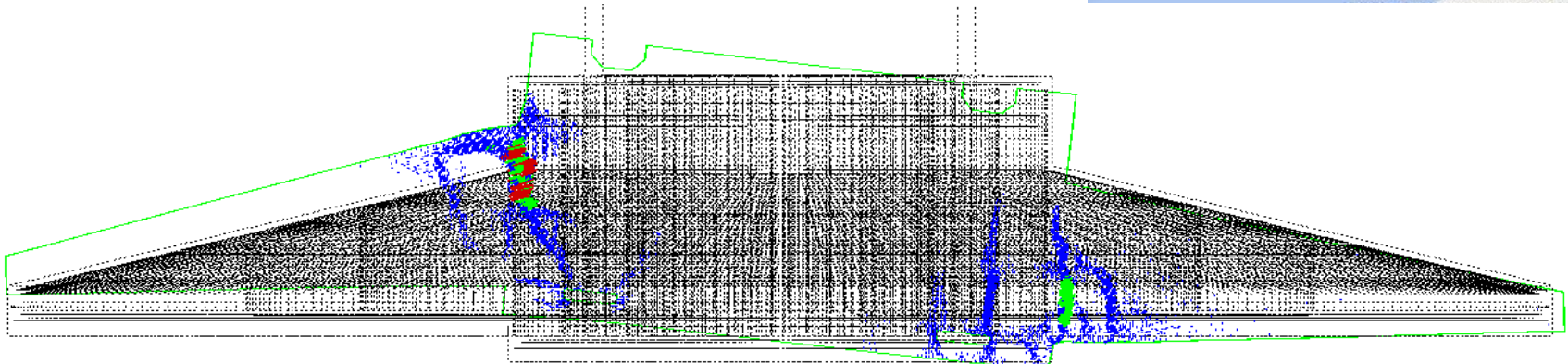
180 windparken

Projecten in 27 landen

# USP Windbase

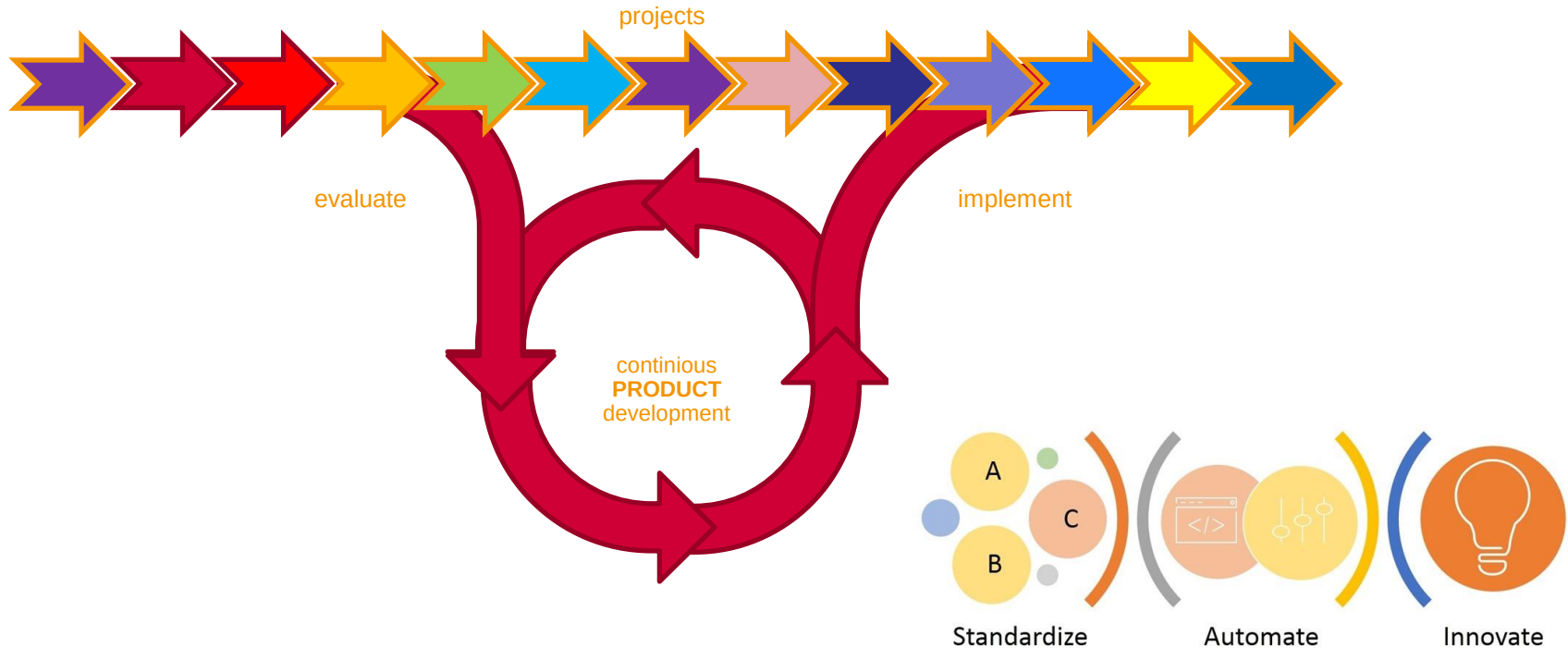
Up to 30% more economical designs by

- Site specific geotechnical designs
  - Advanced FEA simulation
- 
- VO, 90% accurate design in 1 day

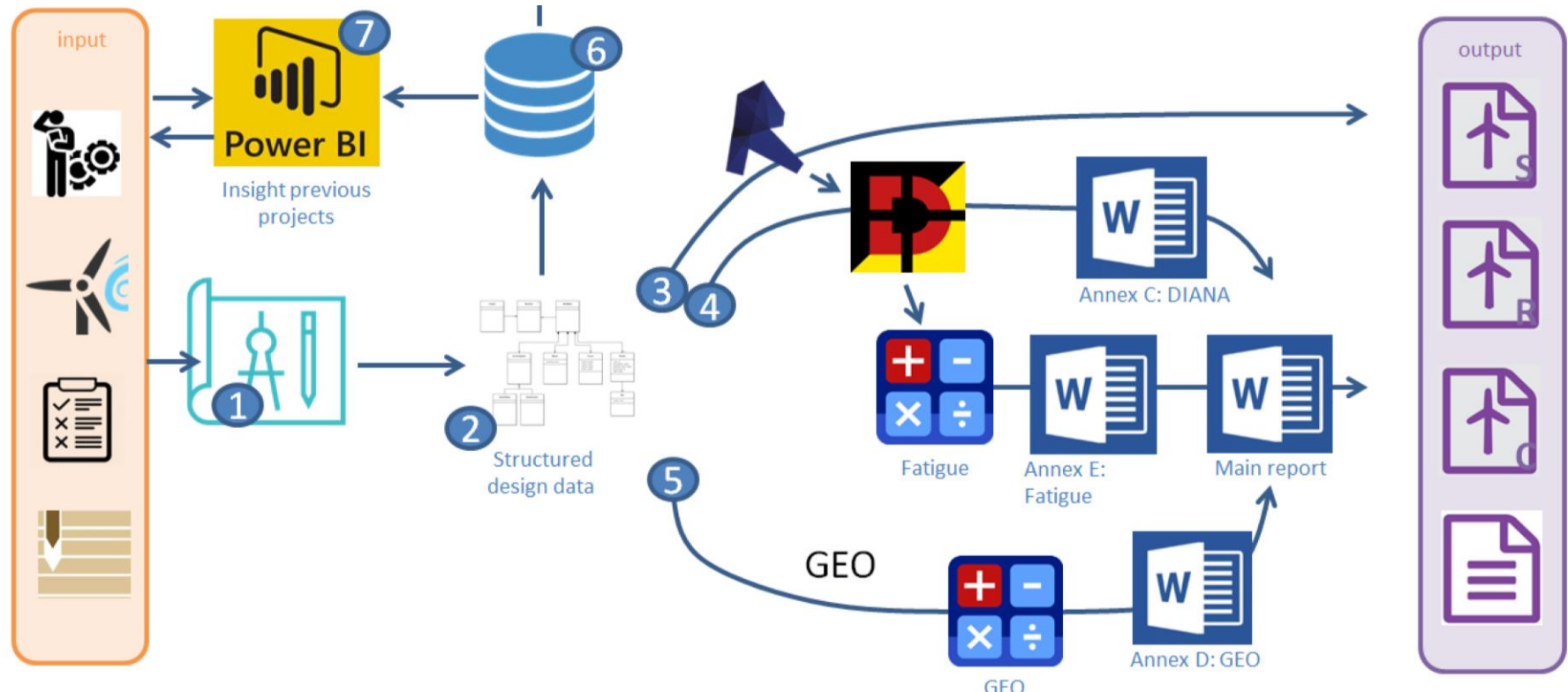




# Product development



## Workflow automation

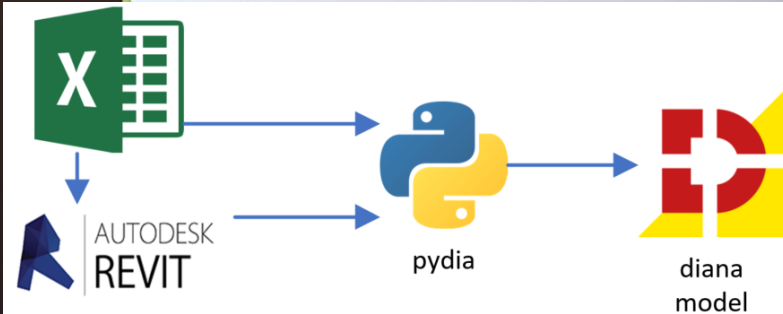
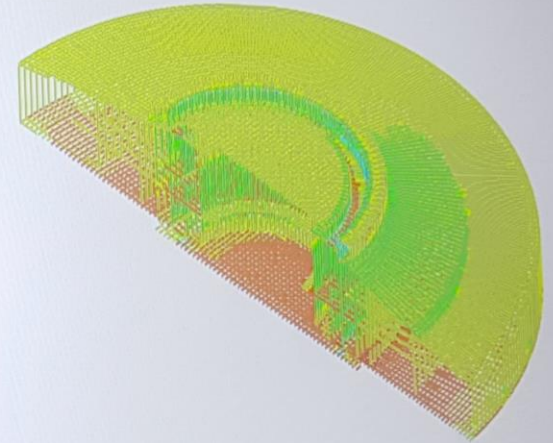


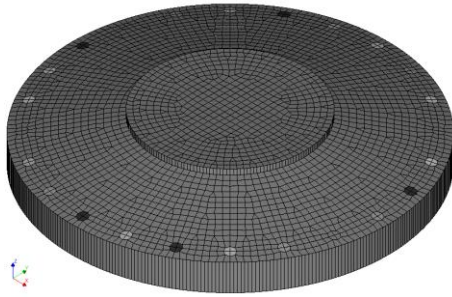


```

18 self.shape = Shape(name)
19 self.name = name
20 self.copies = self.shape.copies
21
22 def assign_material(self, material):
23     """
24     Assign material properties to the line.
25
26     :param material: (MaterialCustom/ str) Object or name of the material.
27     """
28     self.shape.assign_material(material)
29
30 def assign_geometry(self, geometry, **kwargs):
31     """
32     Assign geometry properties to the line. The geometry objects element_class
33     will be converted to reinforcement.
34
35     :param geometry: (GeometriesCustom)
36     :param kwargs: Extra option for reinforcement
37                     - discret: (str) Discretization method. Standard is "SECTION"
38     """
39     if geometry.element_class == "REBAR": # No element classes and change the
40         d = kwargs.get("discret", "SECTION")
41         py_assignGeometry(geometry.name, self.name)
42         py_setReinforcementAspects([self.name])
43         py_setReinforcementDiscretization([self.name], d)
44     else:
45         self.shape.assign_geometry(geometry)
46
47 def set_element_size(self, element_size):
48     self.shape.set_element_size(element_size)
49
50 def set_data(self, element_data):

```

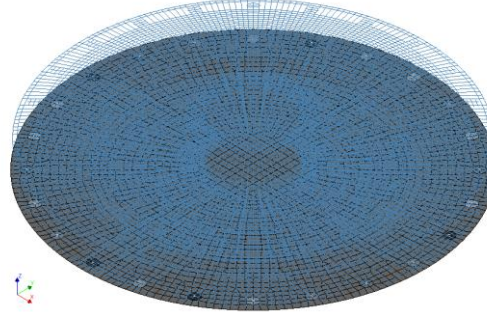




3D FEA model

50h

1



2.5D FEA model

1h / variant

50



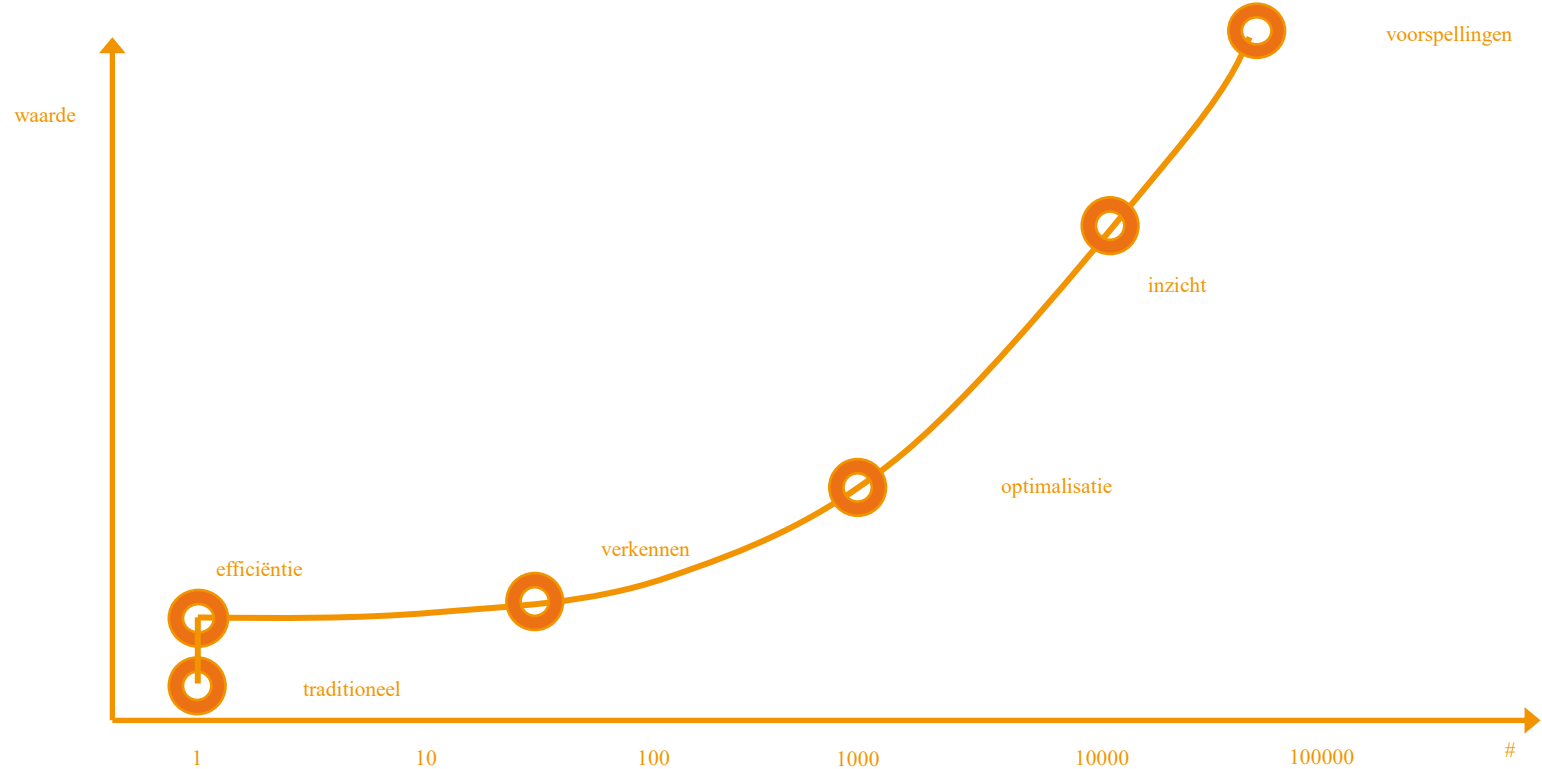
ML

0,001sec / variant

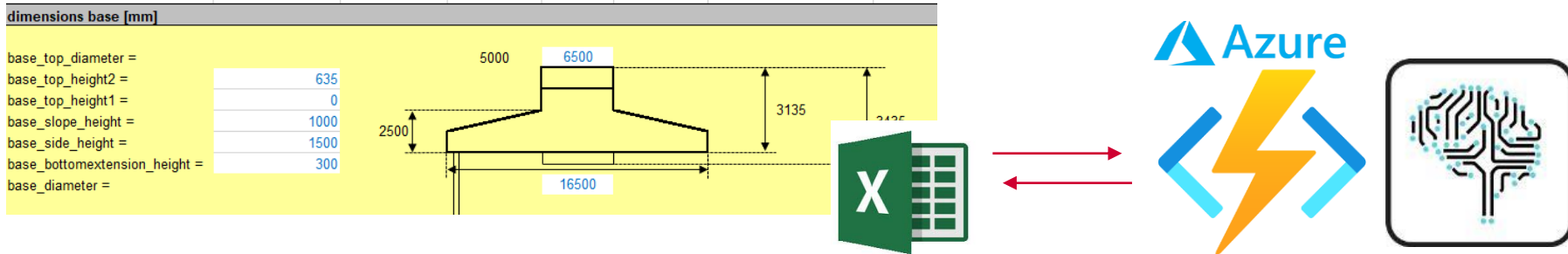
3 miljoen



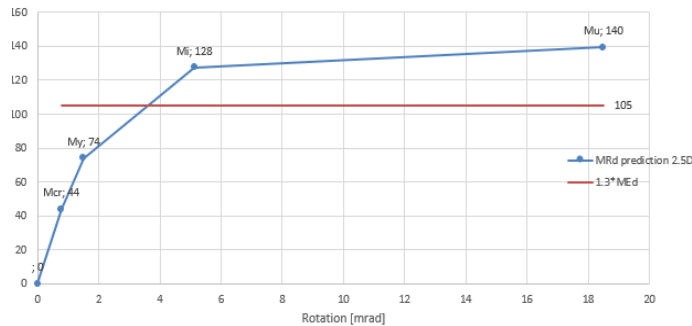
# Leren van simulatie



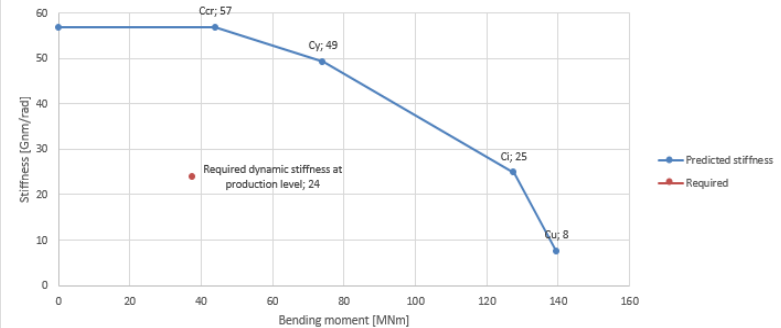
# Democratize: AI predicts capacity instantly



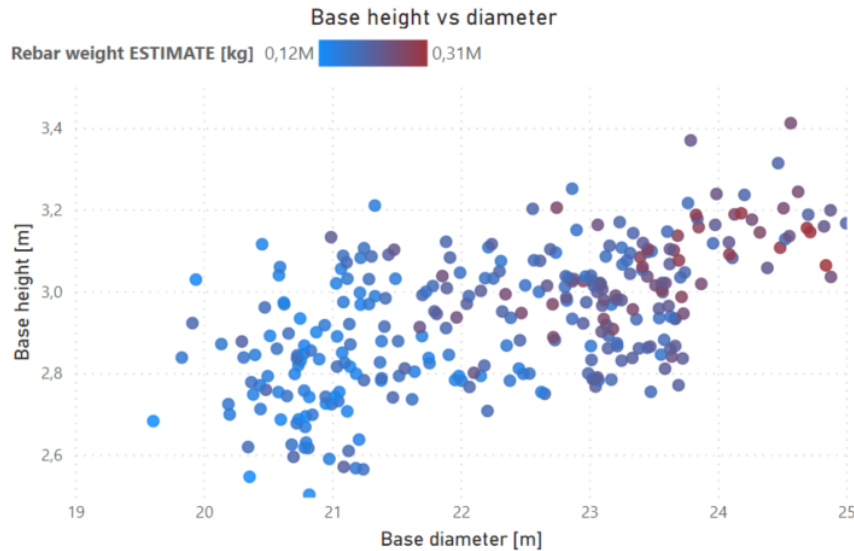
Estimation of moment curvature graph



Estimation of rotational stiffness as function of the bending moment



# Simuleer en filter



|                                                 |                                                           |
|-------------------------------------------------|-----------------------------------------------------------|
| <p>Base diameter [m]</p> <div>12,50 25,00</div> | <p>Base height [m]</p> <div>1,50 4,50</div>               |
| <p>Base_side_height</p> <div>1,50 2,19</div>    | <p>Base_slope_height</p> <div>0,00 2,31</div>             |
| <p>Volume [m3]</p> <div>210,62 1.602,67</div>   | <p>Rebar weight ESTIMATE [kg]</p> <div>37070 451313</div> |

# VALIDATIE VAN GEAUTOMATISEERD REKENWERK



## Type and search

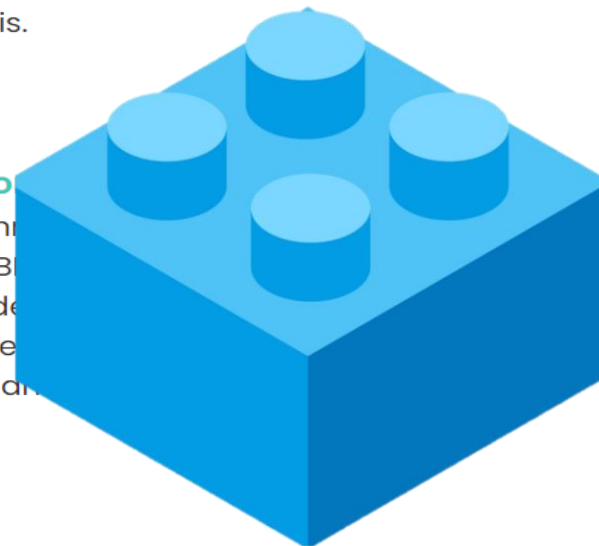
- Constructie
  - + Algemeen
  - + Belastingen
  - + Beton
  - + Brand
  - + Brontabellen
  - + Duurzaamheid
  - + Glas
- Hout
  - Aansluitvlak
  - Balklaag
  - Brandwerendheid
  - Duurzaamheidsklasse
  - Gevel

**Gevalideerde software op één plek**

BRiCKs begeleid gebruikers naar de juiste gevalideerde (reken-)software. Via BRiCKs worden Excelsheets en applicaties van softwareleveranciers ontsloten én voorzien van een label: voorkeur, acceptabel of nog te valideren. Gebruik zoveel mogelijk de voorkeursvariant en stap alleen over naar "acceptabel" als dat noodzakelijk is.

**Voor en door**

Collega's, kennissen en Oosterhoff kunnen met BRiCKs feedback is welkom om de vragen. Wil je een Excelsheet of heb je vragen, klik dan





## Berekening enkelvelds houten balk op enkele buiging



## Berekening enkelvelds houten balk op enkele buiging



| D | E           | F              | G | H |
|---|-------------|----------------|---|---|
|   | datum:      | 5 januari 2023 |   |   |
|   | referentie: |                |   |   |
|   | code:       |                |   |   |
|   | onderdeel:  |                |   |   |

## Berekening enkelvelds houten balk op enkele buiging

### Invoer

- type vloer of dak
- uiterlijk
- gevolgklasse
- belastingcategorie
- klimaatklasse
- materiaal
- sterkteklasse
- breedte
- hoogte
- overspanning

overige vloeren en daken die intensief door personen worden gebruikt  
het uiterlijk van de constructie is van belang  
CC2

Categorie B: kantoorruimtes

1

gezaagd\_naaldhout

C24

$b$  mm 130

$h$  mm 680

$l$  m 5,00

Page 1

### Belastingen

- blijvende gelijkmatig verdeelde belasting excl. eigen gewicht
- opgelegde gelijkmatig verdeelde belasting
- blijvende gelijkmatig verdeelde belasting incl. eigen gewicht
- kar. waarde gelijkmatig verdeelde belasting in z-richting
- rekenwaarde gelijkmatig verdeelde belasting in z-richting

|                  |      | vgl. 6.10a          | vgl. 6.10b     |
|------------------|------|---------------------|----------------|
| $G_k (-sw)$ kN/m | 4,0  |                     |                |
| $Q_k$ kN/m       | 8,0  | $* 1,5 * 0,5 =$ 6,0 | $* 1,5 =$ 12,0 |
| $G_k$ kN/m       | 4,4  | $* 1,35 =$ 5,9      | $* 1,2 =$ 5,2  |
| $Q_{k,ar}$ kN/m  | 12,4 |                     |                |
| $Q_{z,d}$ kN/m   | 17,2 | 11,9                | 17,2           |

### Buiging

- buiging
- dwarskracht
- uiteindelijke doorbuiging

|               |      |        |       |     |      |
|---------------|------|--------|-------|-----|------|
| $M_{y,d}$ kNm | 53,9 | $\leq$ | 148,0 | uc: | 0,36 |
| $V_{z,d}$ kN  | 43,1 | $\leq$ | 145,1 | uc: | 0,30 |
| $u_{fin}$ mm  | 3,6  | $\leq$ | 20,0  | uc: | 0,18 |



## Berekening enkelvelds houten balk op enkele buiging

### Invoer

type vloer of dak  
uiterlijk  
gevolgklasse  
belastingcategorie  
klimaatklasse  
materiaal  
sterkteklasse  
breedte  
hoogte  
overspanning

overige vloeren en daken die intensief door personen worden gebruikt  
het uiterlijk van de constructie is van belang  
CC2  
Categorie B: kantoorruimtes  
1  
gezaagd\_naaldhout  
C24  
130  
680  
5,00

### Belastingen

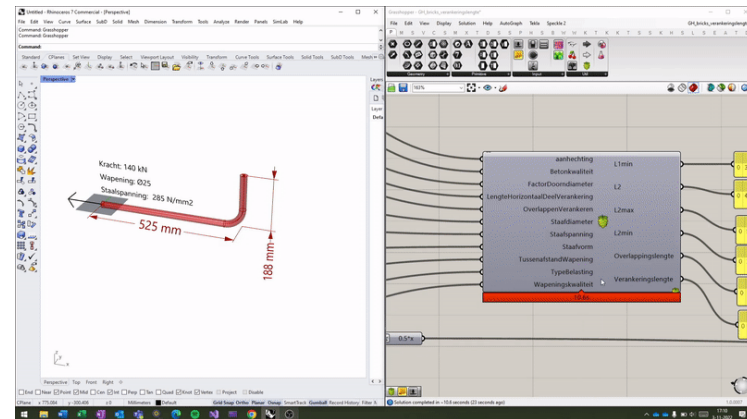
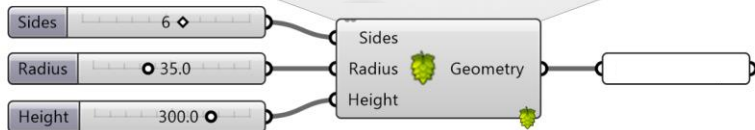
blijvende gelijkmatig verdeelde belasting excl. eigen gewicht  
opgelegde gelijkmatig verdeelde belasting  
blijvende gelijkmatig verdeelde belasting incl. eigen gewicht  
kar. waarde gelijkmatig verdeelde belasting in z-richting  
rekenwaarde gelijkmatig verdeelde belasting in z-richting

|                  |      |                             |                    |
|------------------|------|-----------------------------|--------------------|
|                  |      | vgl. 6.10a                  | vgl. 6.10b         |
| $G_{k, row}$ kNm | 4,0  |                             |                    |
| $G_{k, k}$ kNm   | 8,0  | $\cdot 1,5 \cdot 0,5 = 6,0$ | $\cdot 1,5 = 12,0$ |
| $G_{k, k}$ kNm   | 4,4  | $\cdot 1,35 = 5,9$          | $\cdot 1,2 = 5,2$  |
| $G_{k, k}$ kNm   | 12,4 |                             |                    |
| $G_{k, z}$ kNm   | 17,2 | 11,9                        | 17,2               |

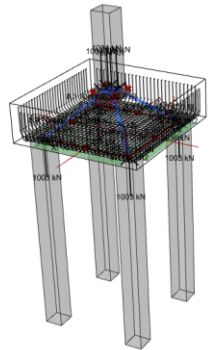
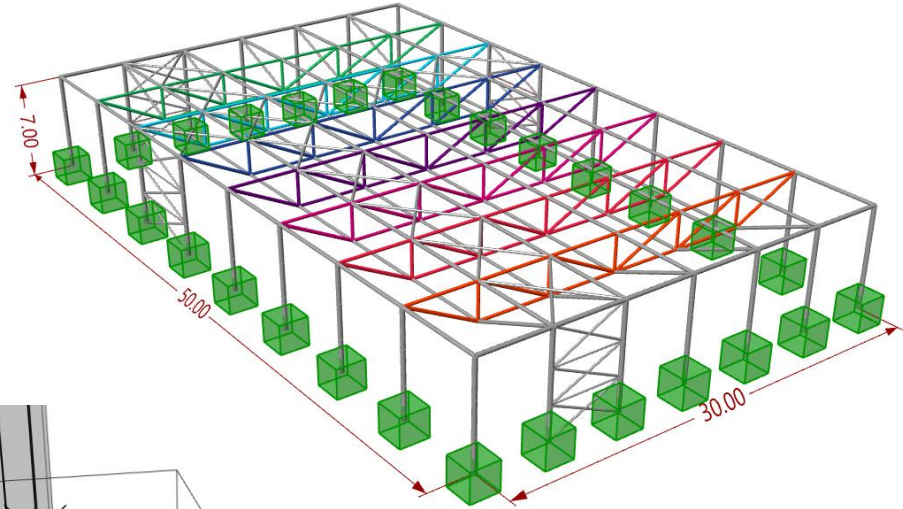
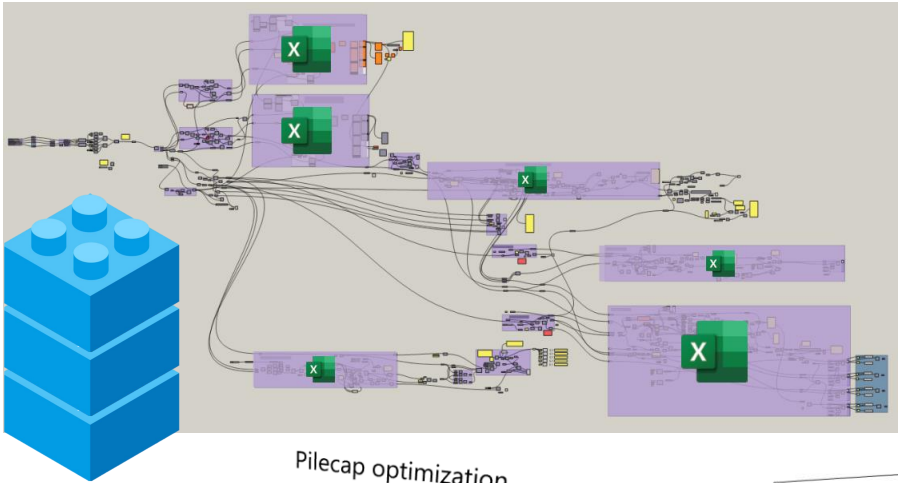
### Buiging

buiging  
dwarskracht  
uiterlijke doorbuiging  
bijkomende doorbuiging

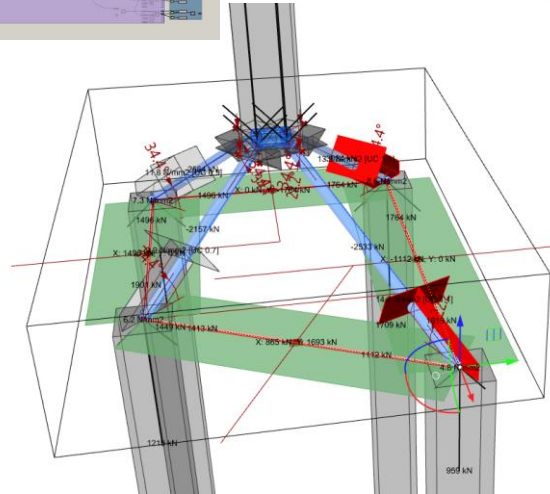
|                |      |        |       |      |      |
|----------------|------|--------|-------|------|------|
| $M_{k, d}$ kNm | 53,9 | $\leq$ | 148,0 | u.c. | 0,36 |
| $V_{k, d}$ kN  | 43,1 | $\leq$ | 145,1 | u.c. | 0,30 |
| $u_{k, d}$ mm  | 3,6  | $\leq$ | 20,0  | u.c. | 0,18 |
| $u_{k, d}$ mm  | 2,6  | $\leq$ | 15,0  | u.c. | 0,17 |



## Keten van gevalideerde Excelsheets



Pilecap optimization  
Capacity: 4000 kN  
Concrete: 11 m3  
Reinforcement: 1602 kg  
CO2: 4379 kg  
Schadowprice: €411,-



**Brick calculator demo**  
Packhult

**Construction**

Calculate the number of bricks required for a brick wall of your desired...

**Cantilever displacement demo**  
Packhult

**Structural**

Calculate the displacement of a cantilever HEA beam with this model...

**I beam section modulus demo**  
Packhult

**Structural**

Calculate the section modulus of an I-beam cross section.

**MRPI Free**  
Stichting MRPI

**Environmental**

Check the environmental impact of planned construction works with the...

**MRPI Pro**  
Stichting MRPI

**Environmental**

Perform advanced and insightful environmental impact calculations fo...

**SolarParking**  
Sveco

**Building products**

Add solar panels to your parking lot to power electric cars while giving them...

**Concrete: Point Supported Plate**  
Matrix Software

**Structural**

Calculate the concrete reinforcement for point supported plates.

**Concrete: Column in Isolated Frame**  
Matrix Software

**Structural**

Calculate the concrete reinforcement for columns in isolated frames.

**Concrete: Cross M+V+T**  
Matrix Software

**Structural**

Calculate the bending moment (M) + shear force (V) + torsion (T) for...

**Automated Pile Cap Design**  
ABT

**Structural**

Designing pile caps can be a cumbersome task that involves multi...

© 2023 06-01 Doe van de constructiezoets - PowerPoint 1

VIKTOR

Product Apps Gallery Why VIKTOR Resources Company Docs

Sign In Book a demo Start for free

All VIKTOR Community Code Examples

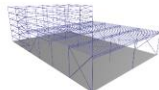
All  
Geotechnics  
Structural  
Energy  
GIS  
Excel  
Maritime & offshore  
Data science  
BIM  
Mechanical



**Beam analysis**

This app can be used to perform 2D structural beam calculations.

Source Code Open App



**Warehouse configurator**

Parametrically design a warehouse in a simplified manner

Source Code Open App



**Seismic analysis**

Seismic analysis of a reinforced concrete building using OpenSeesPy

Source Code Open App

Prev Next

Welkom

r-tunda Homepage Werkwijze Analyses Nieuws

Producten

Filtre: Beschikbaar Prijs

Sorteer op: Alfabetisch A-Z 3D producten

**r-tunda**  
Kleinere schaal projectie  
-50%

**Klein-schalige planvorming**  
DWB  
€50,00

Opties kiezen

**Analyse begroting**  
DWB  
Vanaf €6.500,00

Opties kiezen

**Analyse CO2 (MRPI)**  
DWB  
Vanaf €7.500,00

Opties kiezen

**Analyse Daglicht**  
DWB  
€30.000,00

Opties kiezen

**Analyse Daglicht**  
DWB  
Vanaf €9.750,00

Opties kiezen

**Analyse Energie (RENO indicatie)**  
DWB  
Vanaf €9.750,00

Opties kiezen

**Analyse Financiële Kosten en Opbrengsten**  
DWB  
Vanaf €9.750,00

**Analyse Rissic Scholen**  
DWB  
Vanaf €6.500,00

**Analyse Beluid**  
DWB  
Vanaf €11.000,00

## Digitalisering Clubjes

### Studio Computational

Building tools together



Are you a structural engineer looking for new ways to make your work more efficient? Join Studio Computational and meet professionals from different companies who share the same interests!

At our design and create workshops, held every three months, you will work together in a group to develop a solution or tool for a self-defined problem, such as automating MKI score workflows with different building materials, creating a workflow for recycled building materials, evaluating different genetic algorithm solvers, etc.

Be inspired, learn something new, and expand your network -all with *Studio Computational*!

Sign up now at [www.VNconstructeurs.nl](http://www.VNconstructeurs.nl) and check out our upcoming dates.

Session #1: April 6th at ABT Delft



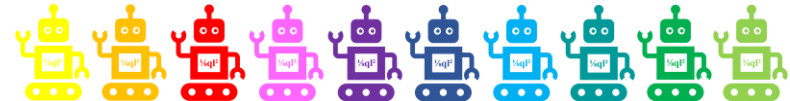
DEC

DIGITAL ENGINEERING COMMUNITY  
SAMEN BOUWEN AAN DIGITALISERING

## Stufib studiecel

RoboCon

- Hoe gaat digitalisering het vak van constructeur veranderen?



<https://stufib.nl/downloads/rapportenstufib/>



# Levels-of-Intelligence

|    |
|----|
| M  |
| CM |
| C  |

**Mens** voert uit, kan hierbij computer gebruiken als hulpmiddel

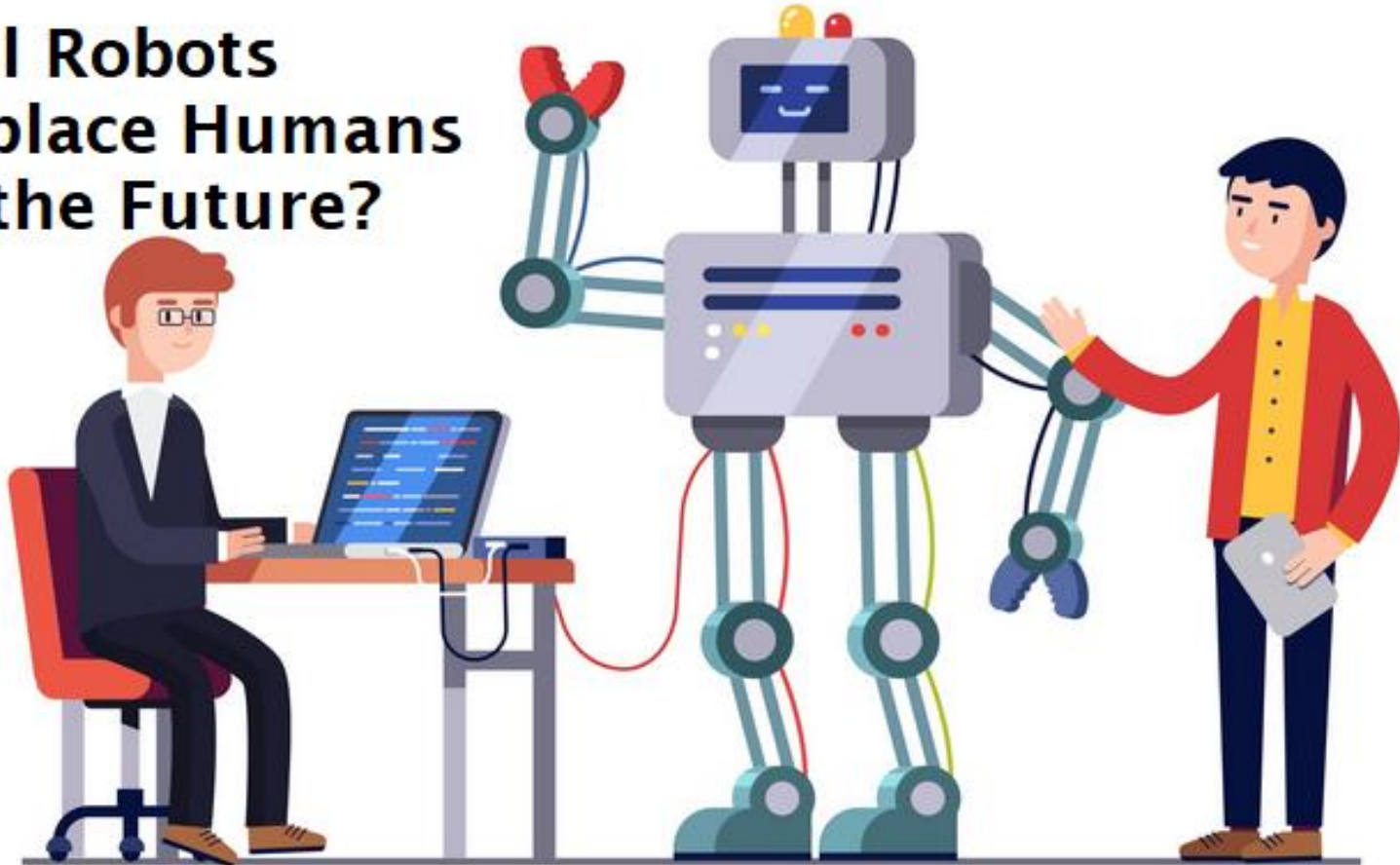
**Samen:** computer voert uit, mens kan dit begrijpen, controleren en bijsturen

**Computer** voert uit

| <i>Stappen constructief ontwerp</i>       | LOI0                | LOI1                   | LOI2                               | LOI3                            | LOI4                               | LOI5                           | LOI6                     |
|-------------------------------------------|---------------------|------------------------|------------------------------------|---------------------------------|------------------------------------|--------------------------------|--------------------------|
|                                           | geen automatisering | automatisering rekenen | automatisering varianten onderzoek | automatisering oplossingsruimte | automatisering oplossings-richting | geautomatiseerd onder toezicht | volledig geautomatiseerd |
| interpreteren vraag en vertalen naar PvE  | M                   | M                      | M                                  | M                               | M                                  | CM                             | C                        |
| oplossingsrichting bepalen                | M                   | M                      | M                                  | M                               | CM                                 | C                              | C                        |
| schematiseren en oplossingsruimte bepalen | M                   | M                      | M                                  | CM                              | C                                  | C                              | C                        |
| varianten ontwikkelen                     | M                   | M                      | CM                                 | C                               | C                                  | C                              | C                        |
| berekenen, toetsen, dimensioneren         | M                   | CM                     | C                                  | C                               | C                                  | C                              | C                        |
| varianten beoordelen                      | M                   | M                      | CM                                 | C                               | C                                  | C                              | C                        |
| raakvlakken afstemmen intern ontwerp      | M                   | M                      | M                                  | CM                              | C                                  | C                              | C                        |
| raakvlakken afstemmen extern              | M                   | M                      | M                                  | M                               | CM                                 | C                              | C                        |
| variant kiezen                            | M                   | M                      | M                                  | M                               | M                                  | CM                             | C                        |

|                                               |  |  |  |  |  |  |  |
|-----------------------------------------------|--|--|--|--|--|--|--|
| Autonomie computer                            |  |  |  |  |  |  |  |
| Interpreteerbaarheid door mens                |  |  |  |  |  |  |  |
| Onderbouwd vertrouwen van mens in de computer |  |  |  |  |  |  |  |
| Mens-computer symbiose                        |  |  |  |  |  |  |  |

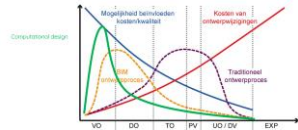
# Will Robots Replace Humans in the Future?





# Recap

## SMARTconnection

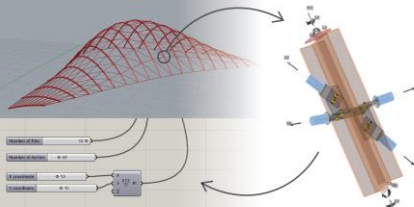


- SMARTconnection
- ChatGPT, Midjourney, Dall-E
- Verschuiving van informatie door digitalisering
- Windbase als geautomatiseerd voorbeeldproject
- Validatie van geautomatiseerd rekenwerk
- Nieuwe samenwerkingen
  - Communitys, marktplaatsen, Code delen

# Staalbouwdag 3 oktober 2023

2019

## Hackathon@Staalbouwdag



33 contestants from 18 different companies will be competing in 9 different teams during the Hackathon@Staalbouwdag! Tuesday 8th October, Van Nelle Fabriek Rotterdam

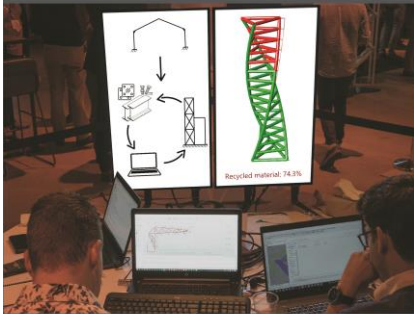
Jury: Maurice Hermans, Ruud Roelinkers, Evert Oudshoorn, Joudi Heijns, Royal Haskoning DHV, ABT, Oostingh ASK Romein, Leysand

Represented companies:



2022

## Hackathon@Staalbouwdag



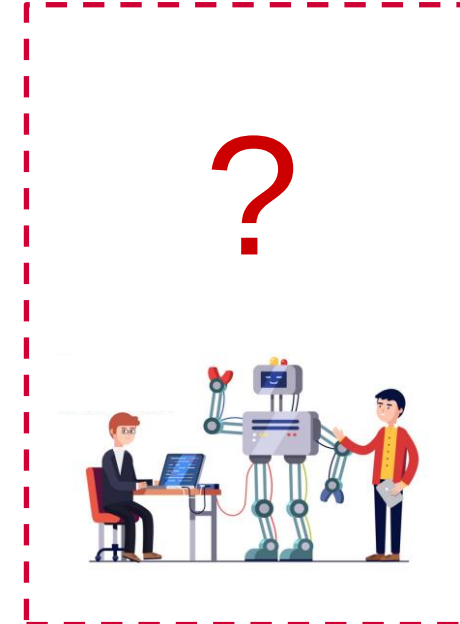
Hackathon@Staalbouwdag is a design contest in which multidisciplinary teams, aided by computational tools, solve a design case within a limited timeframe. This year's theme is sustainability and designing with a limited stock of material, form follows availability.

Will we see you there?  
Tuesday 4th October, AFAS theater Leusden

Enroll at:  
<https://www.bouwenmetstaal.nl/evenementen/hackathon-staalbouwdag-2022>

bouwen met  
staal

2023







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