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BIM technology use in railway infrastructure related projects in Poland

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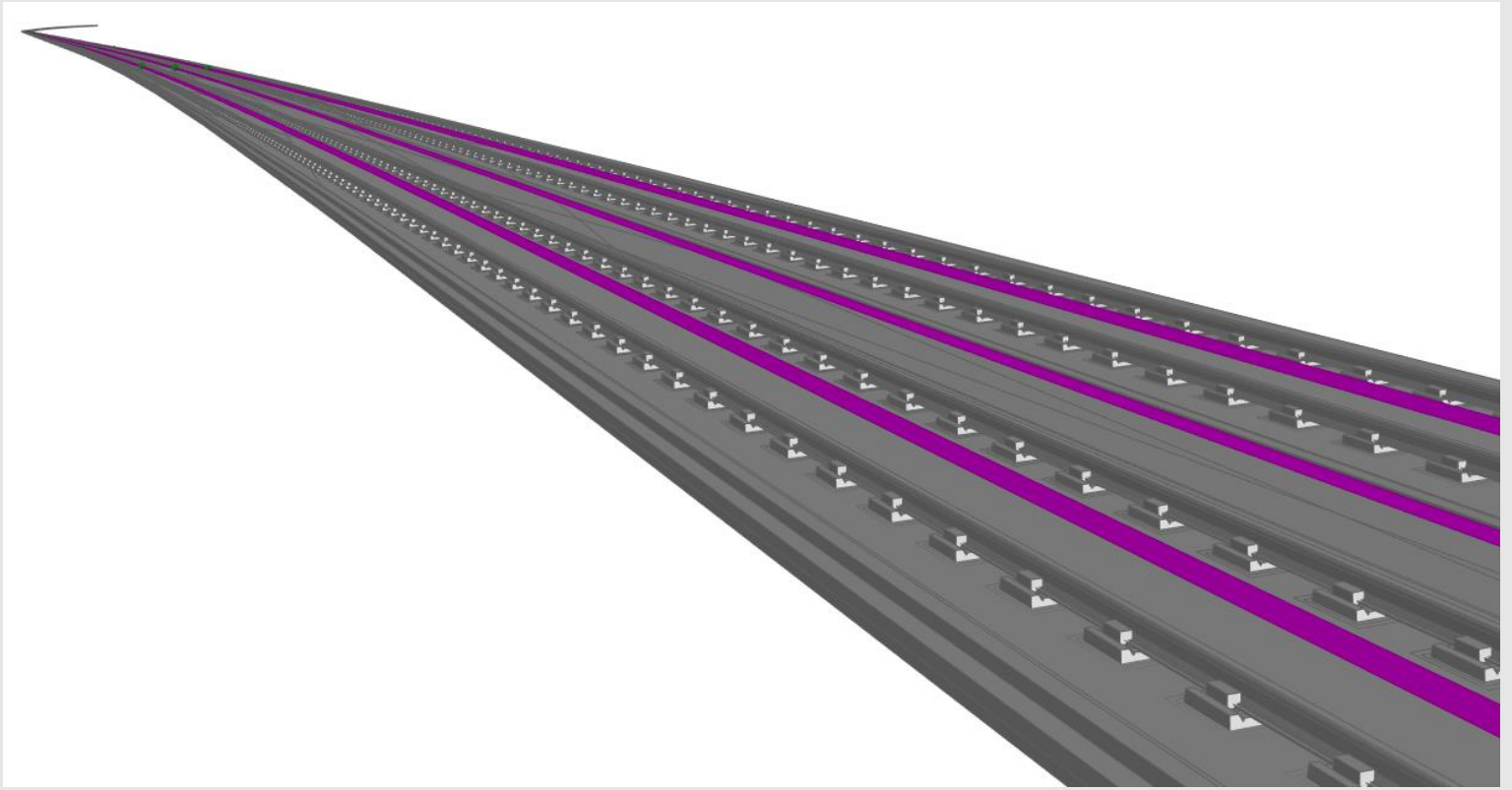
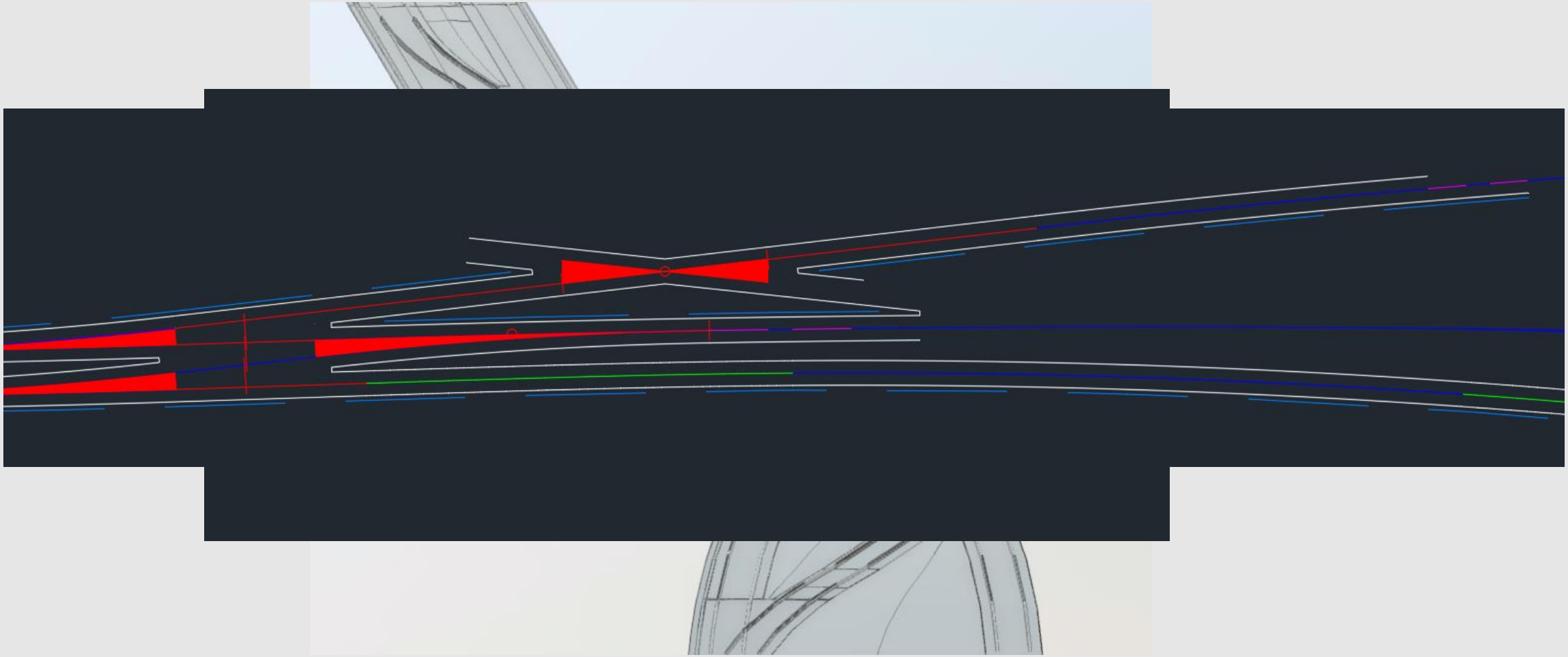
Railway model

Components of the model:

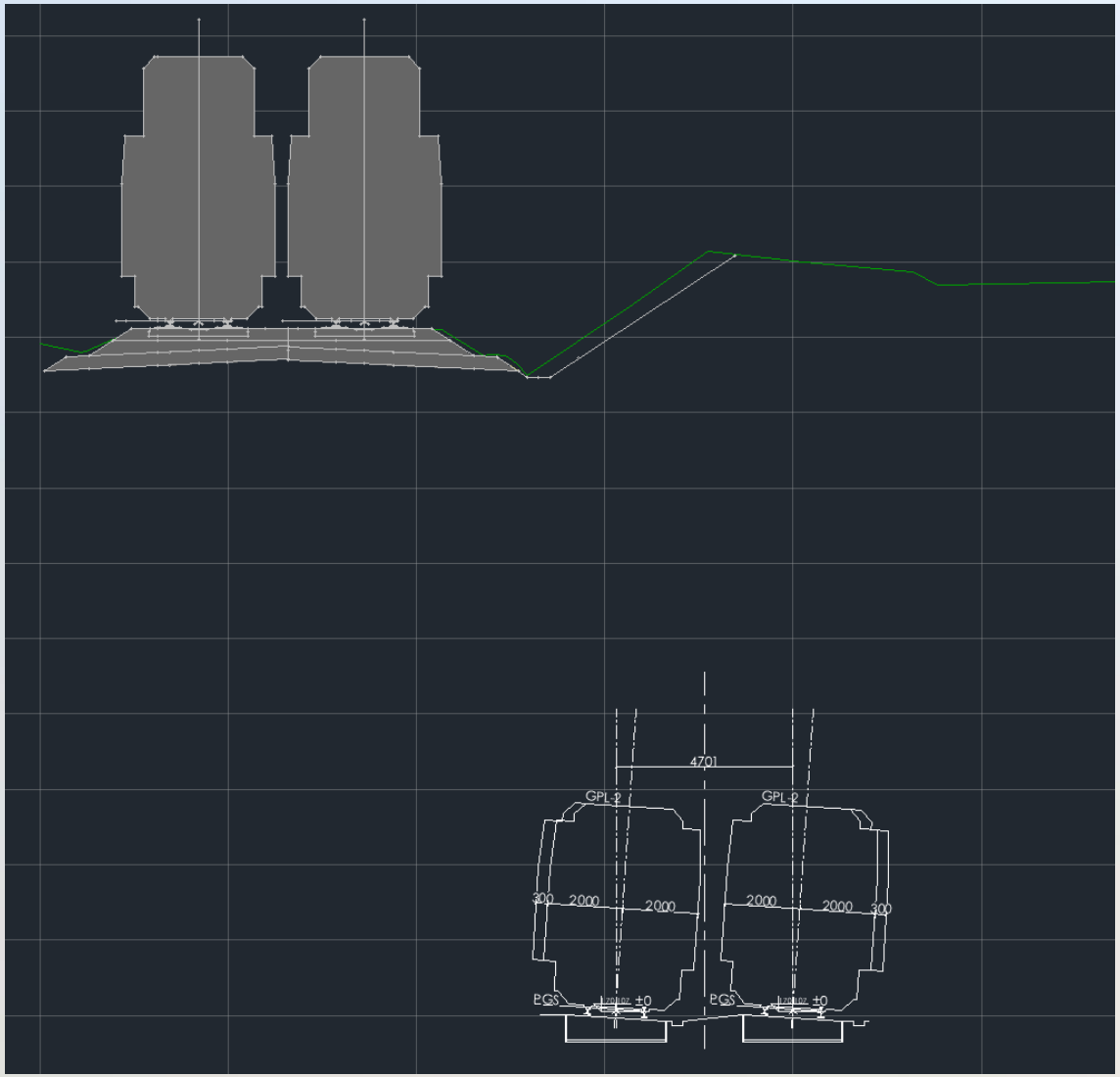
- Clearance
- Tracks axes
- Rails
- Rail supports
- Ballast track:
  - Layers:
  - Ballast
  - Sub-ballast
  - Frost protective layer
  - Subgrade
  - Under Ballast Mats
- Ballastless track:
  - Slabs
  - Under Slab Mats, Side Mats
- Drainage:
  - Ditches
  - Drainage channels



3D model to 2D drawing transition



3D model to 2D drawing transition



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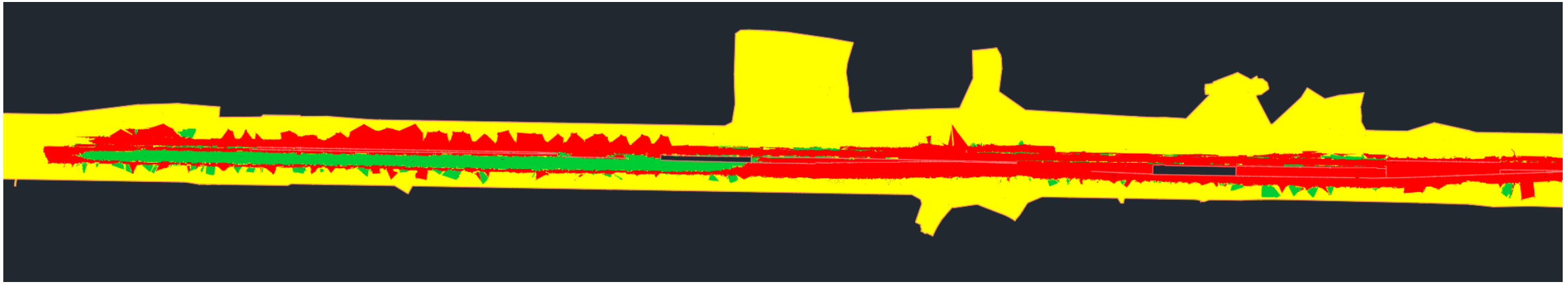
Automation of earthwork balance

- Earthowrks balance is generated directly from 3D model
- Values can be displayed in the form of a chart, tabular format, or plan with colors symbolizing cut/fill

Nazwa	Wykop (dostosowany)(m3)	Nasyp (dostosowany)(m3)	Netto (dostosowana)(m3)	Wykres netto	Powierzchnia 2D(m.kw.)
R00_bilans	148176.54	16246.46	131930.08<Wykop>		1277115.80



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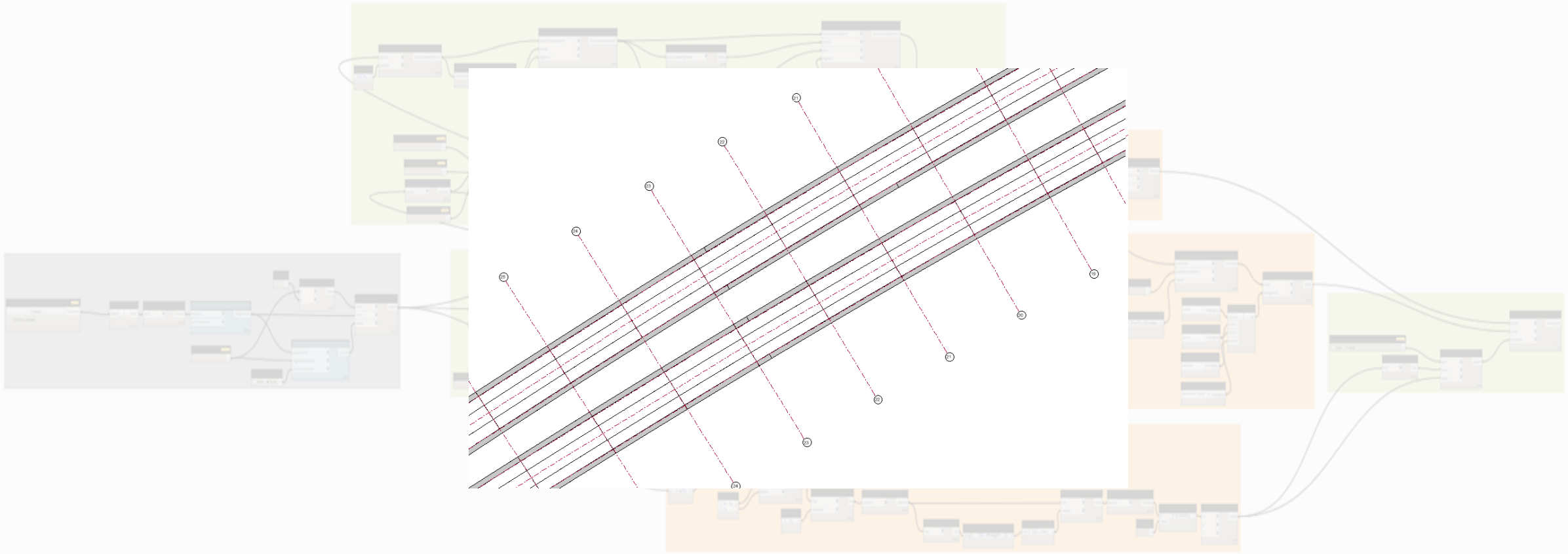
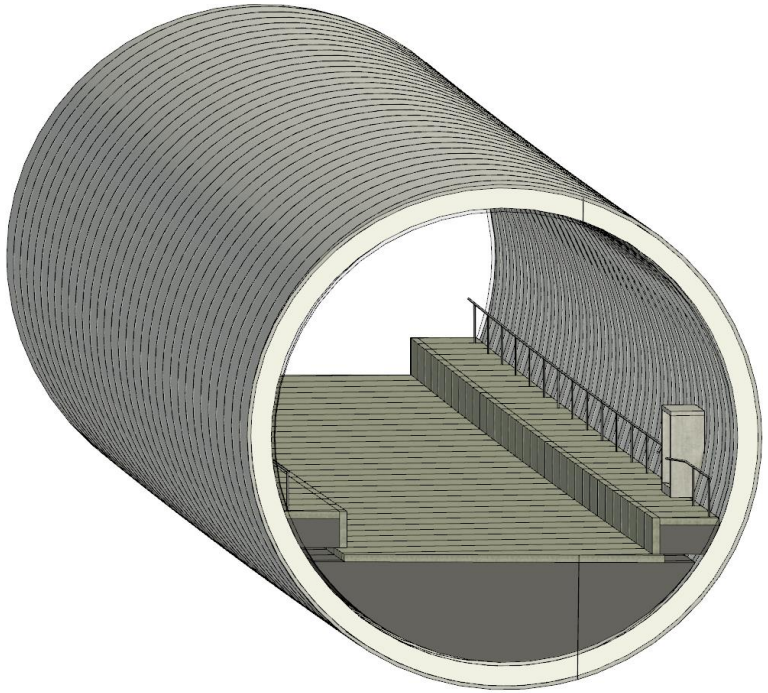
Parametric structural design

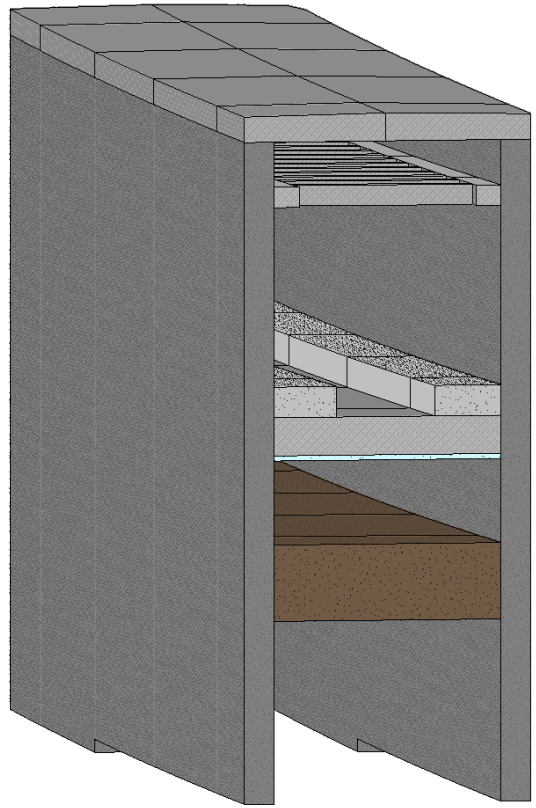


Construction model

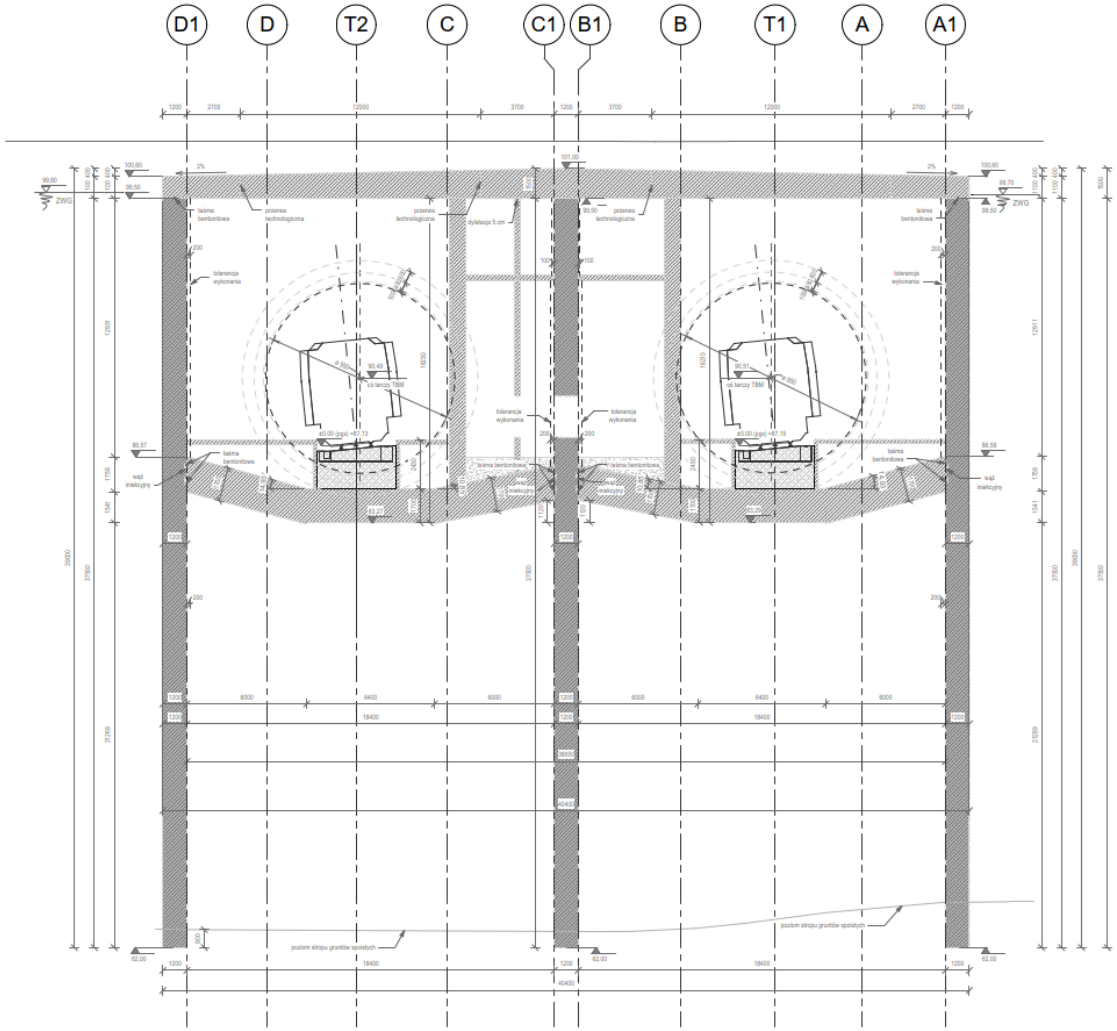
TBM tunnel



Cut & cover tunnel



Drawing documentation



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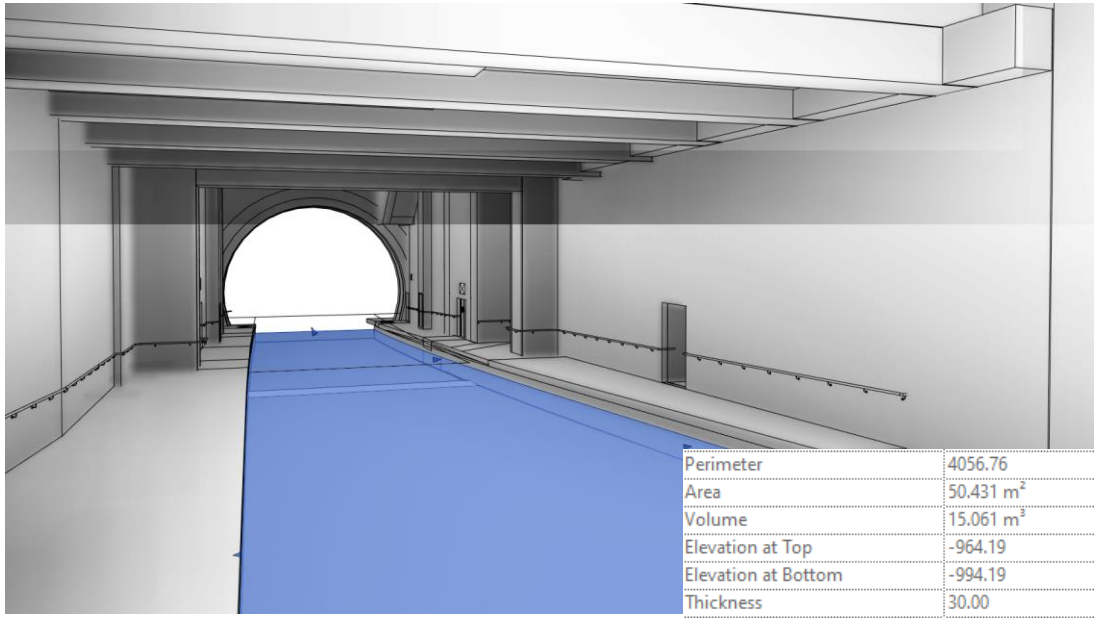
Cost estimation

Parameters and measurements in real time



<Zestawienie stropów>

A	B	C	D	E	F
Typ	Wysokość płyty [cm]	Powierzchnia [m2]	Objętość [m3]	Materiał	Klasa betonu
MTP-PZB-ZLM-VA-20	20	60,05	12,01	Żelbet	C35/45
MTP-PZB-ZLM-VA-20	20	59,21	11,84	Żelbet	C35/45
MTP-PZB-ZLM-VA-20: 4		407,44	81,49		
MTP-PZB-ZLM-VA-30	30	97,91	29,37	Żelbet	C30/37
MTP-PZB-ZLM-VA-30	30	95,25	28,57	Żelbet	C30/37
MTP-PZB-ZLM-VA-30	30	20,81	6,24	Żelbet	C30/37
MTP-PZB-ZLM-VA-30	30	20,02	6,01	Żelbet	C30/37
MTP-PZB-ZLM-VA-30	30	183,40	55,02	Żelbet	C30/37
MTP-PZB-ZLM-VA-30	30	104,01	31,20	Żelbet	C30/37
MTP-PZB-ZLM-VA-30: 6		521,39	156,42		

Automatically generated schedules

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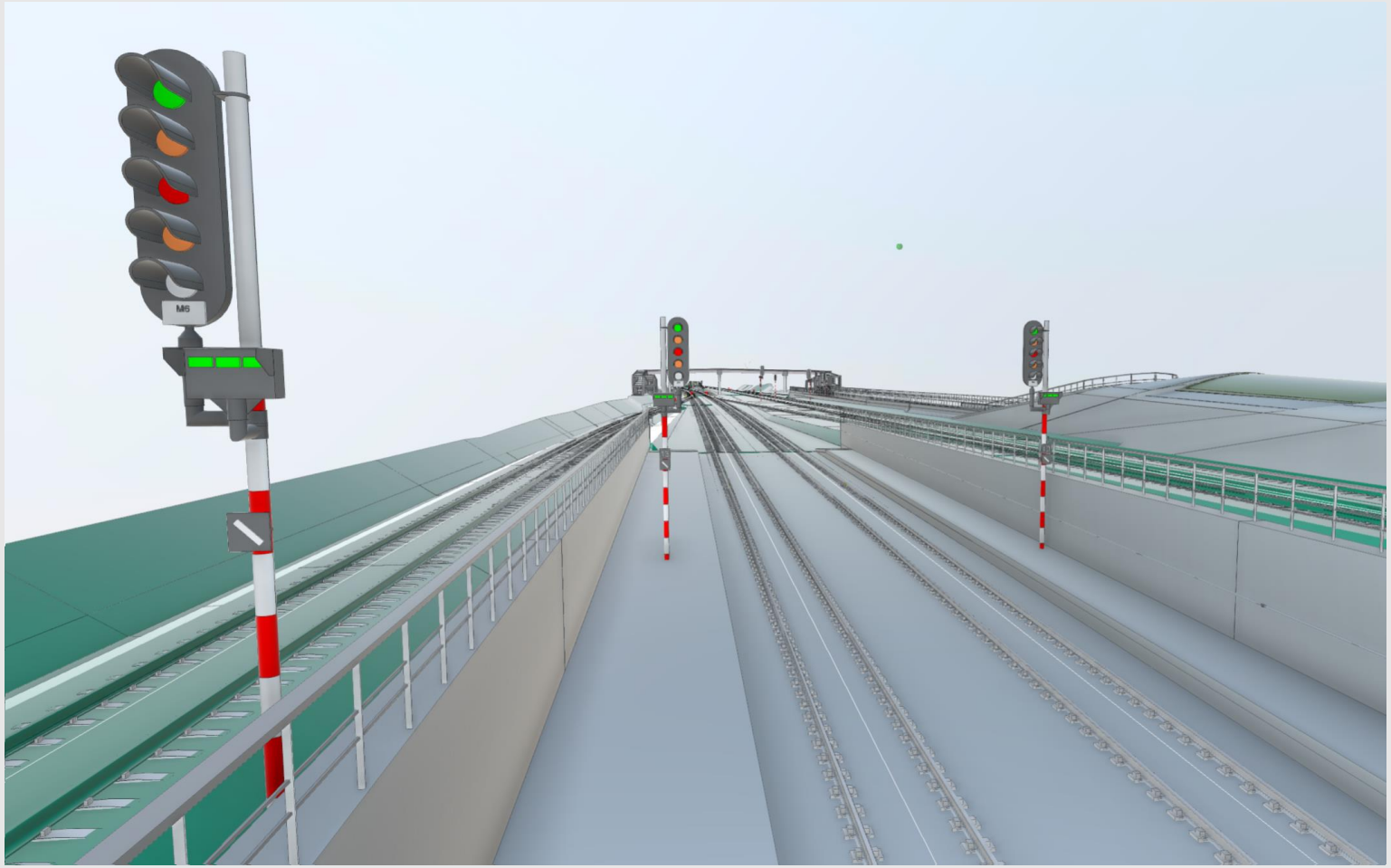
CCS model



3D Graphical Representations of:

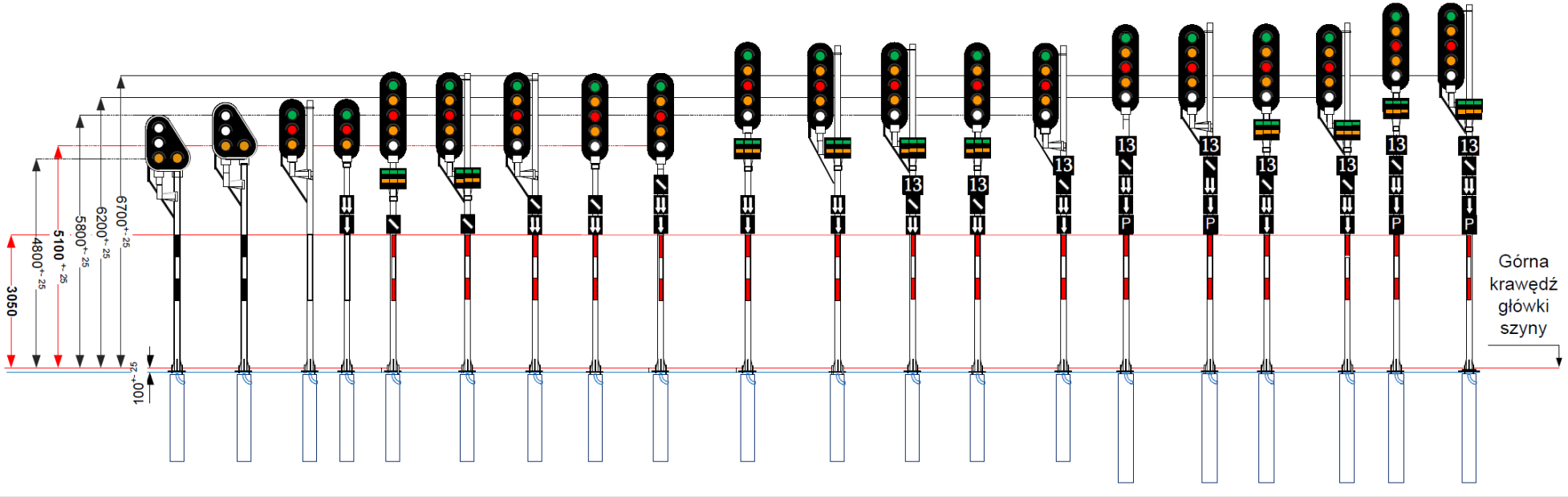
- individual CSS devices:
  - in specific locations,
  - appropriately parameterized.

Polish Rail Signals

- Number of light chamber
- Light colors
- Position of the signal head

Diversity
Of Polish Rail Signals

- Light stripes
- Indicators
- Height of the signal head attachment



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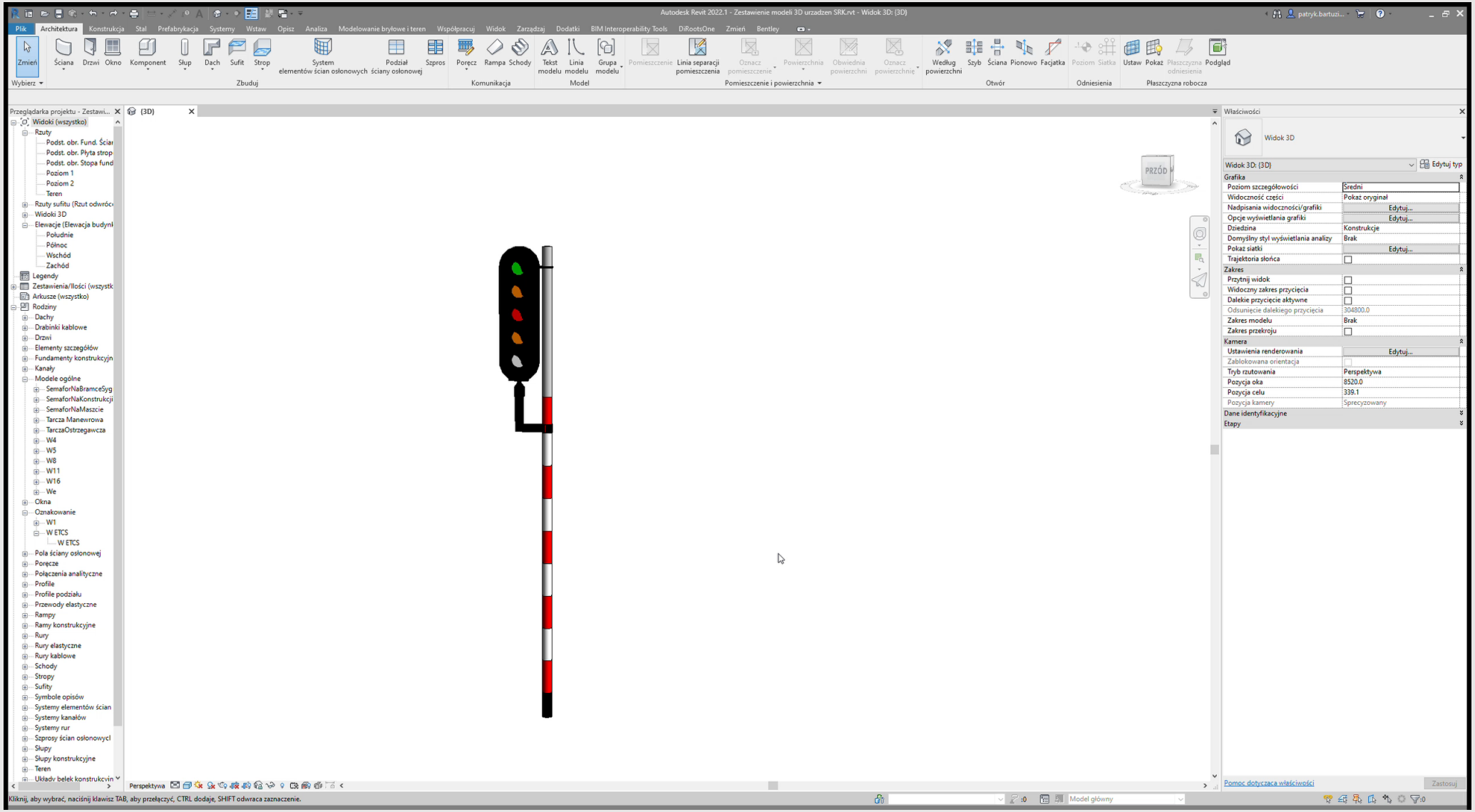
Revit family



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Civil3D and Revit incompatibility

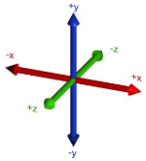
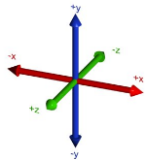
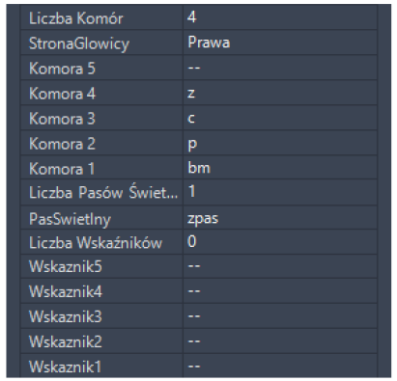
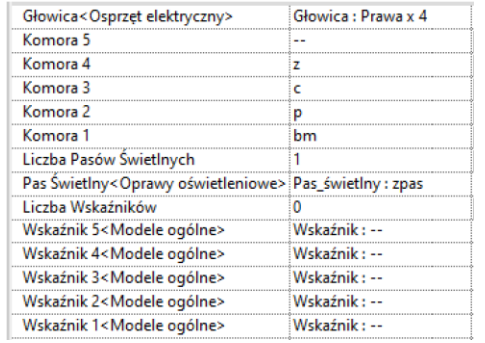
Railway Industry:
- track axis
- coordinates data

Dynamic block

CCS Industry:
- signal families

Revit family

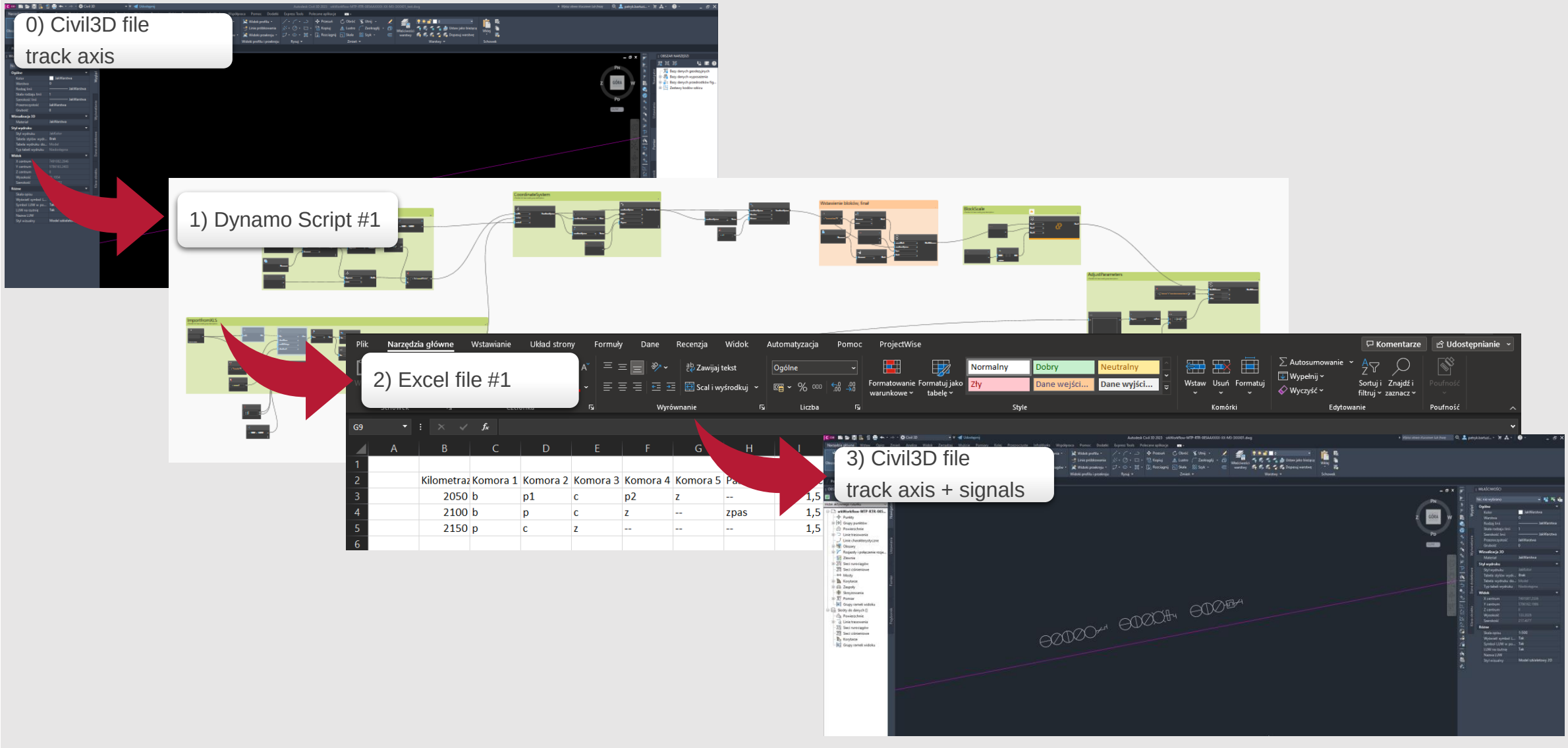
Civil3D dynamic block

Software	C3D		RVT
Graphical representation	Dynamic block		Revit family
Coordinates			
Parameters			

Liczba Komór	4
StronaGlowicy	Prawa
Komora 5	--
Komora 4	z
Komora 3	c
Komora 2	p
Komora 1	bm
Liczba Pasów Świet...	1
PasSwietlny	zpas
Liczba Wskaźników	0
Wskaznik5	--
Wskaznik4	--
Wskaznik3	--
Wskaznik2	--
Wskaznik1	--

Głowica<Osprzęt elektryczny>	Głowica : Prawa x 4
Komora 5	--
Komora 4	z
Komora 3	c
Komora 2	p
Komora 1	bm
Liczba Pasów Świetlnych	1
Pas Świetlny<Oprawy oświetleniowe>	Pas_świetlny : zpas
Liczba Wskaźników	0
Wskaźnik 5<Modele ogólne>	Wskaźnik : --
Wskaźnik 4<Modele ogólne>	Wskaźnik : --
Wskaźnik 3<Modele ogólne>	Wskaźnik : --
Wskaźnik 2<Modele ogólne>	Wskaźnik : --
Wskaźnik 1<Modele ogólne>	Wskaźnik : --

CCS model workflow



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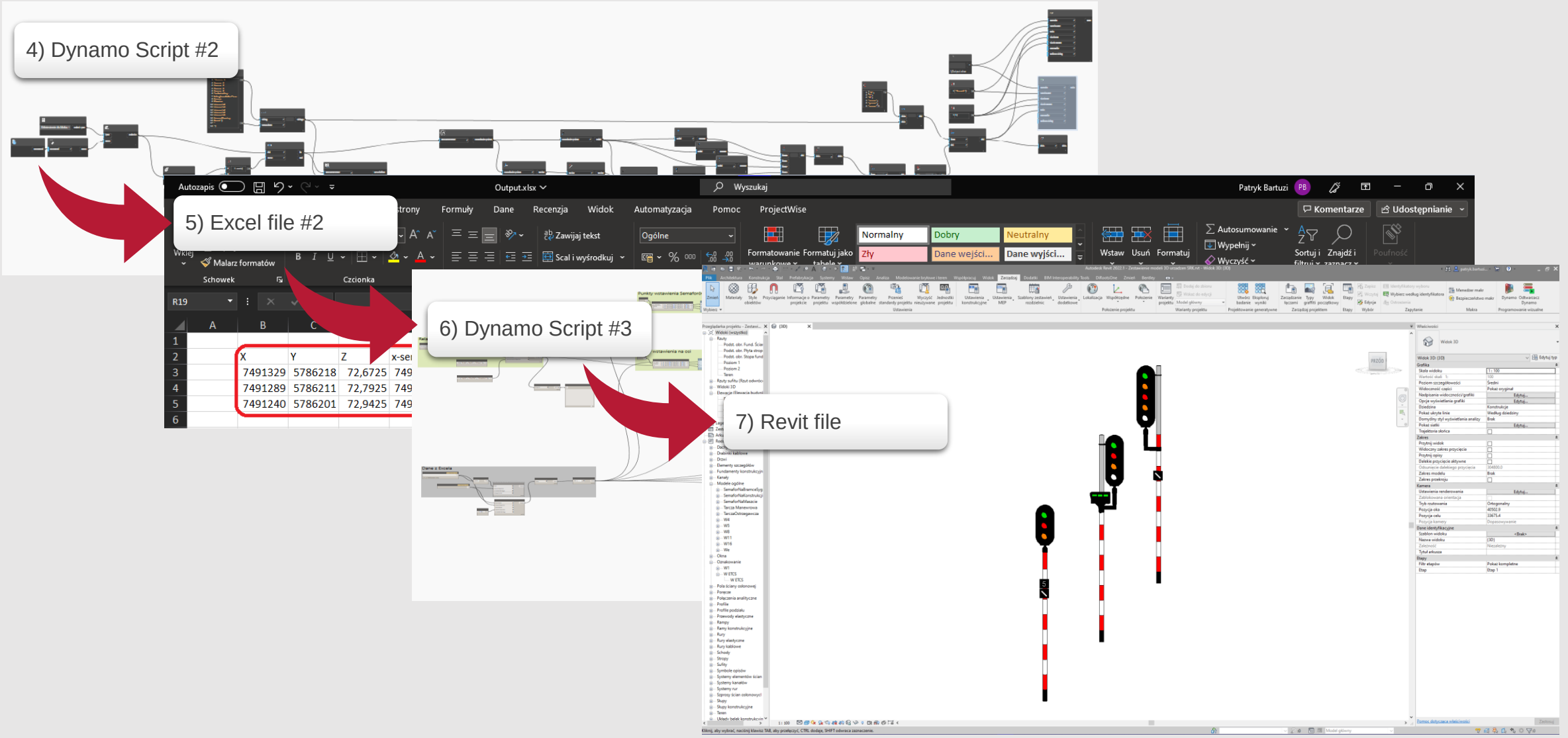
CSS model workflow



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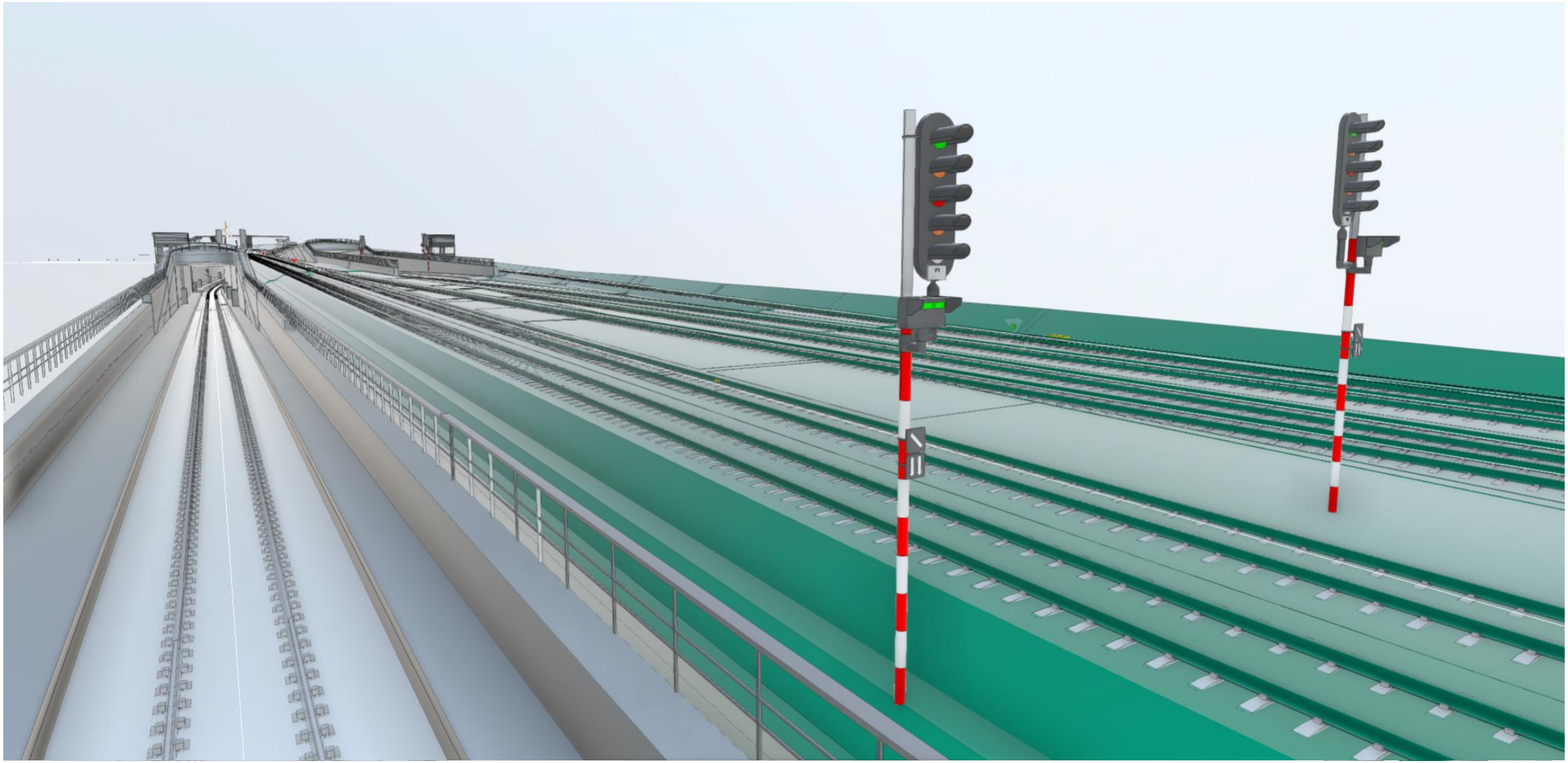
Advantages of BIM in the CCS systems designing

- Every CCS device in 3D BIM Model
- One space for creating and updating the model
- Full compatibility of 2D and 3D documentation
- Visibility test
- Collision verification
- Automatic data export

Coordination model



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Thank you for your attention

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