

BIM Data Content Guiding Takt Production Material Flow: IFC Meets MTS Supply Chain

Otto Alhava, Jyrki Oraskari, Tommi Arola, Tero Järvinen,
Markus Järvenpää and Bettina Ruottinen

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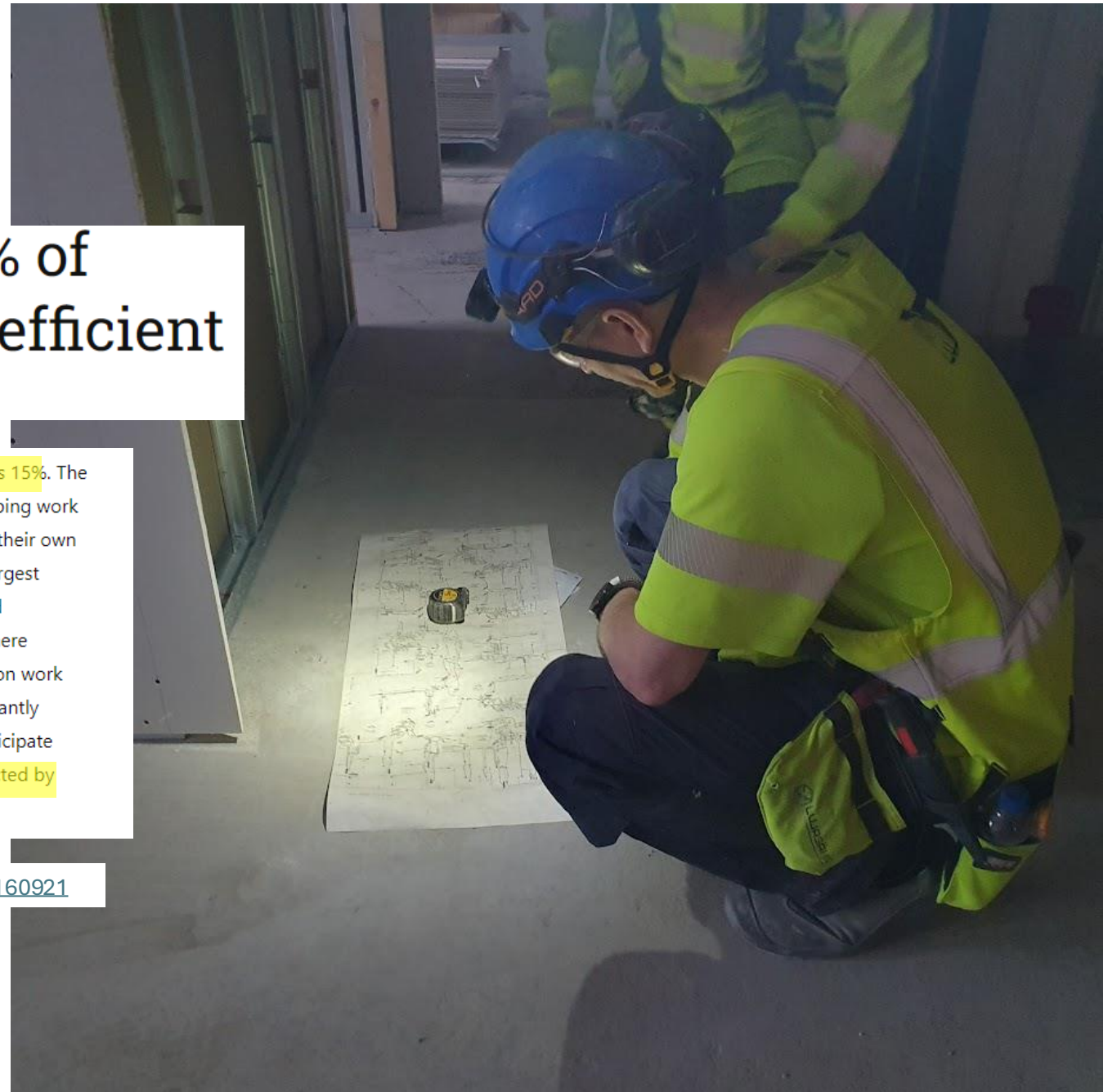
Motivation

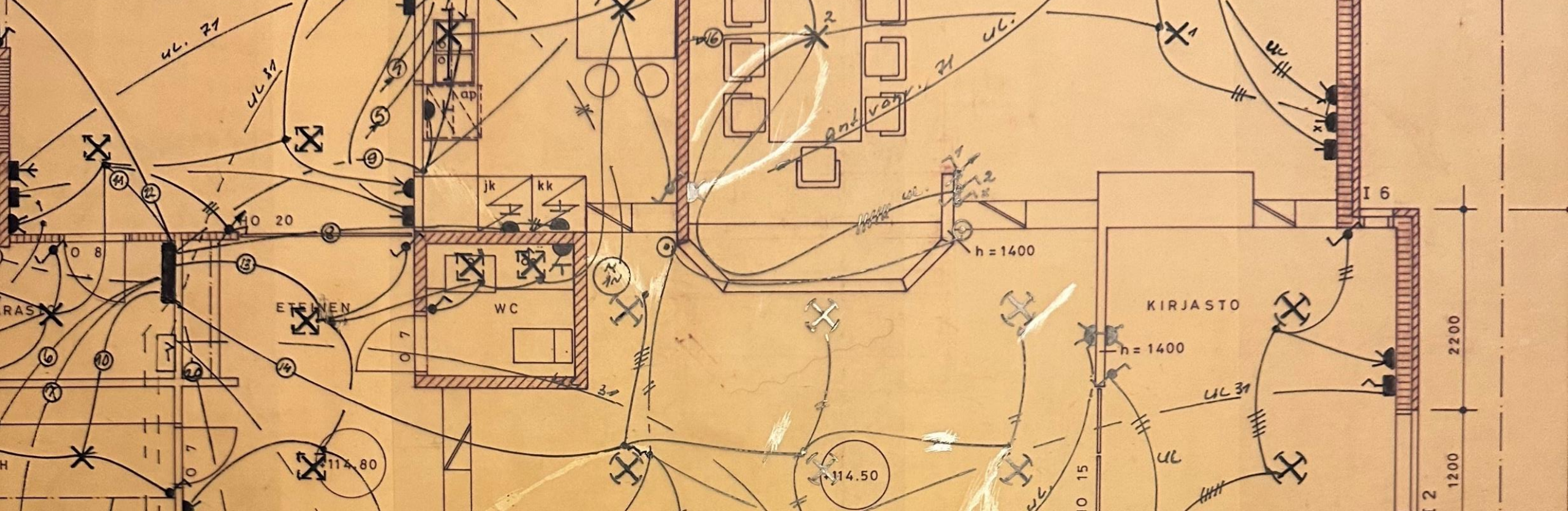
New study reveals up to 80% of construction site work is inefficient

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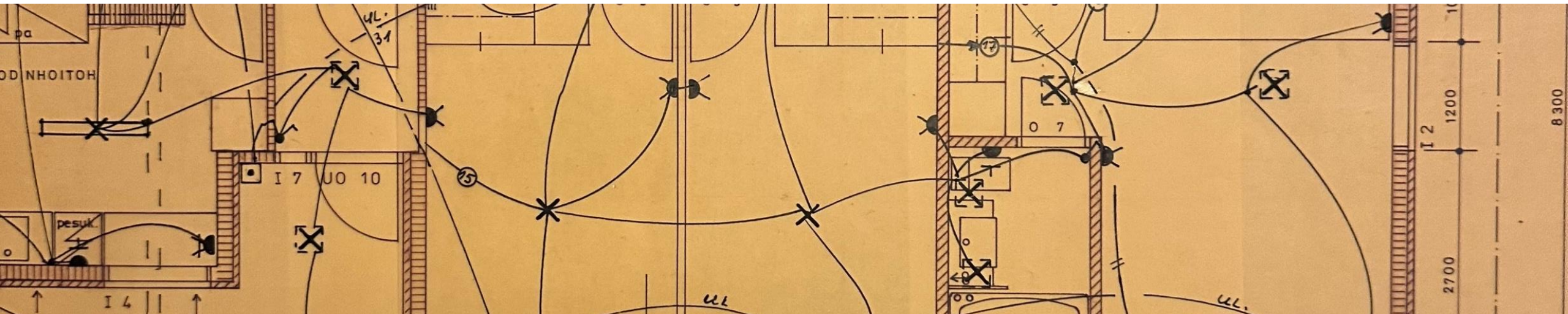
In electrical work, the proportion of installation time was 24%, and in plumbing work, it was 15%. The low proportion of installation time was mainly due to material logistics challenges in plumbing work and the readiness of preceding tasks in electrical work. A variety of construction sites with their own specific characteristics were included in the study. The work was most productive on the largest shopping centre site (installation work accounting for 25%), where the main contractor had improved production control by implementing the takt production method. On the site where installations had been delayed due to the COVID-19 pandemic, the proportion of installation work was only 14%. Regarding communication, the main finding was that installers need significantly more information than they currently receive in the existing process and are willing to participate more in, for example, work planning. The productivity of all installers was significantly affected by planning challenges.

Source: <https://aaltodoc.aalto.fi/items/50fc72ac-0c4b-438f-8b48-a2f3da160921>

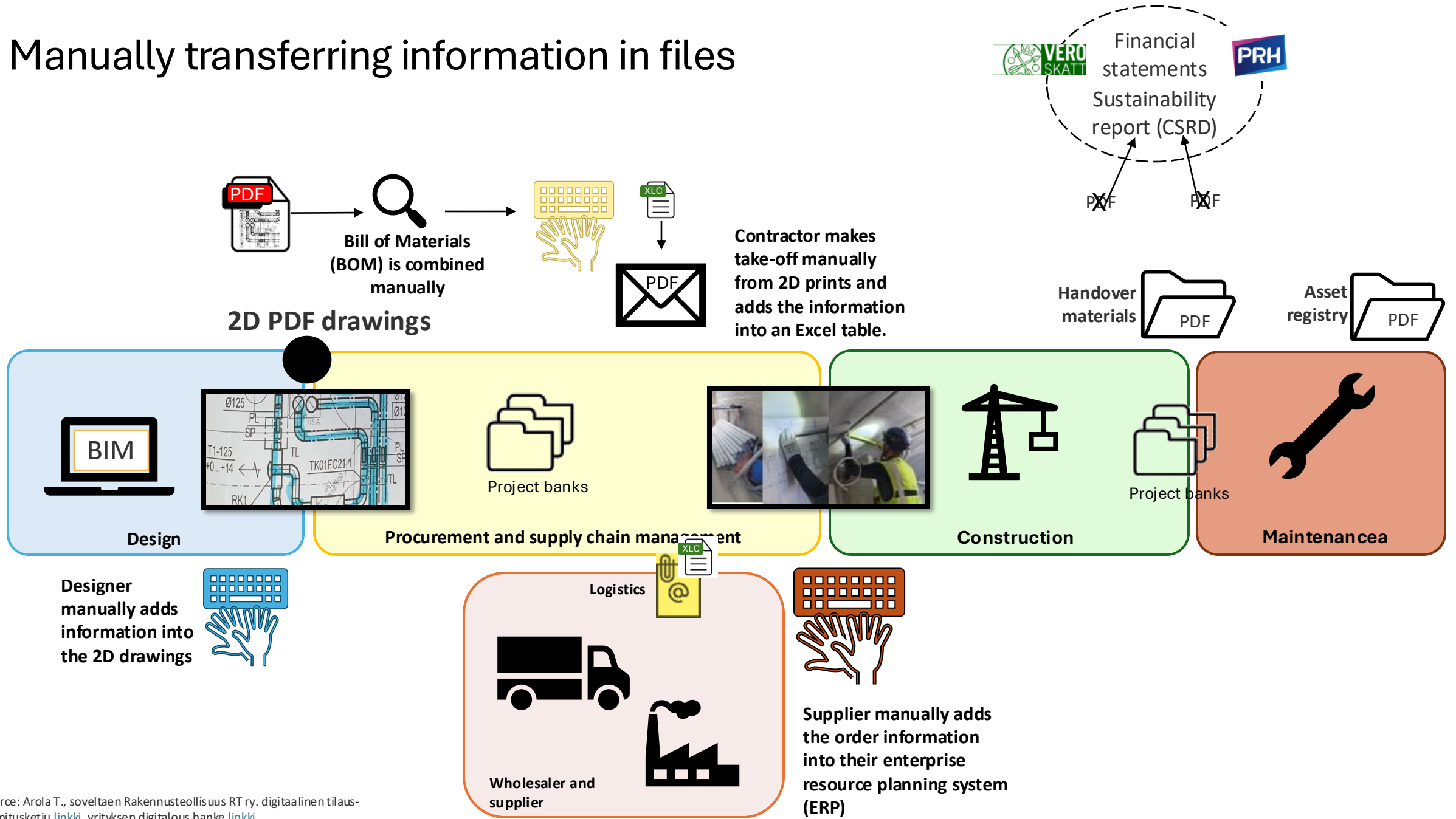




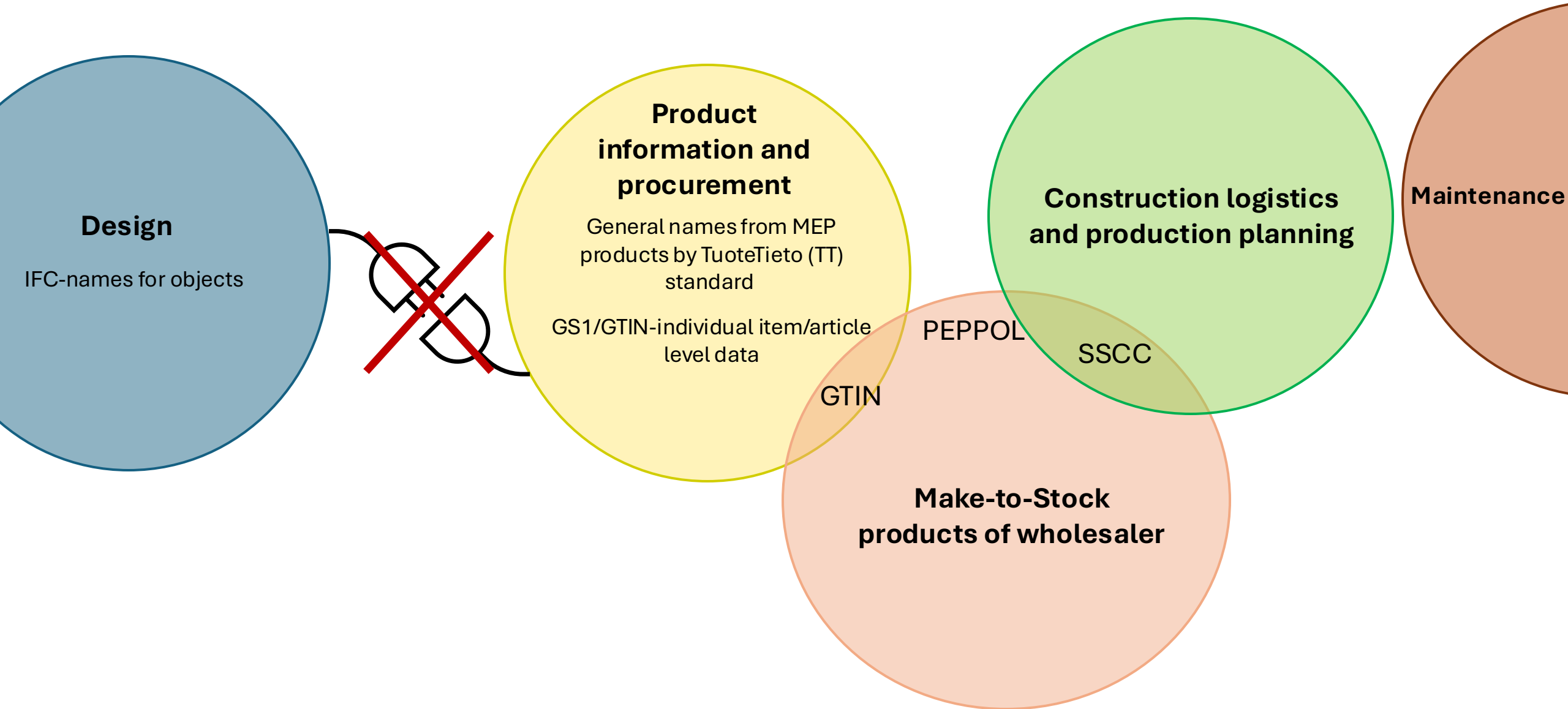
What has changed in the past 50 years?



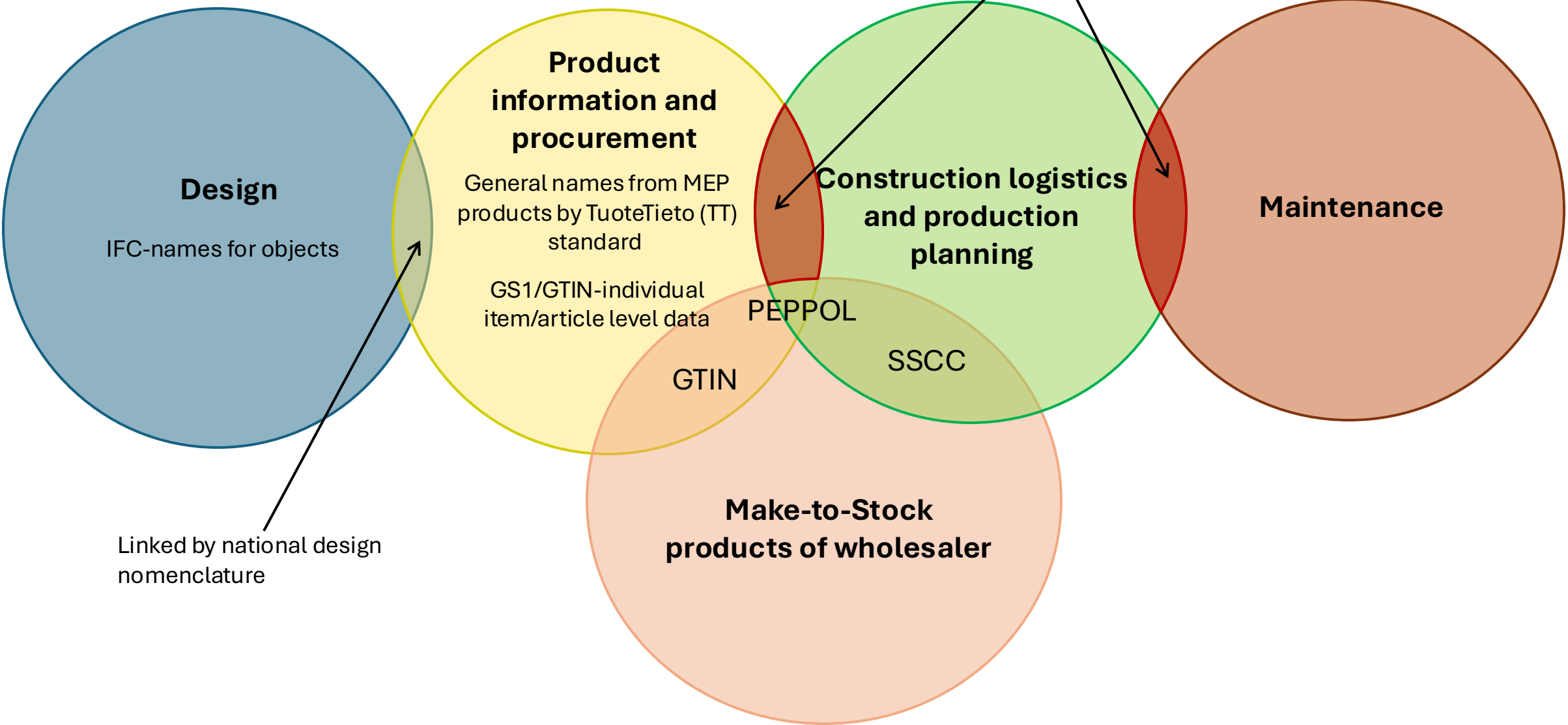
Manually transferring information in files



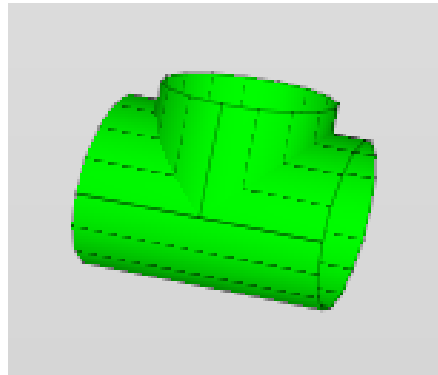
Design information is disconnected from other phases



Linked Building Data



An example – what it means?



Divider = 125



Divider = 125

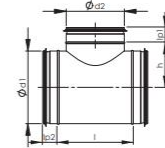


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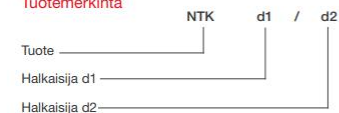
NORDduct | NTK

NTK T-yhde

Nimellismitta d ₁ /d ₂ (mm)	l (mm)	l _{p1} (mm)	l _{p2} (mm)	h (mm)	Paino (kg)
80/80	170	35	35	52	0,4
100/80	176	35	30	60	0,5
100/100	182	35	30	65	0,5
125/80	168	35	30	75	0,5
125/100	168	35	30	98	0,5
125/125	196	35	30	98	0,7
160/80	200	35	30	85	0,7
160/100	168	35	30	115	0,7
160/125	212	35	30	115	0,8
160/160	236	35	30	115	1,0
200/100	174	35	30	135	0,7
200/125	212	35	30	135	0,9
200/160	309	35	30	135	1,1
200/200	306	35	30	135	1,3
250/100	172	35	50	160	1,0
250/125	198	35	50	160	1,2
250/160	302	35	50	160	1,3
250/200	320	35	50	160	1,7
250/250	350	35	50	160	2,1
315/100	204	35	50	193	1,2
315/125	219	35	50	193	1,4
315/160	261	35	50	193	1,7
315/200	320	35	50	193	2,1
315/250	398	35	50	193	2,8
315/315	408	35	50	193	3,0
400/100	172	35	50	235	2,1
400/125	254	35	50	235	2,3
400/160	271	35	50	235	2,7
400/200	314	35	50	235	3,3
400/250	350	35	50	235	3,7
400/315	454	35	50	235	4,4
500/100	212	35	61	285	2,8
500/125	232	35	61	285	3,1
500/160	297	35	61	285	3,5
500/200	362	35	61	285	4,3
500/250	367	35	61	285	4,8
500/315	462	35	61	285	5,8
630/100	223	35	61	350	3,7
630/125	237	35	61	350	4,0
630/160	322	35	61	350	4,4
630/200	366	35	61	350	5,3
630/250	442	35	61	350	6,0
630/315	473	35	61	350	7,0
800/250	405	35	96	461	8,3
800/315	450	35	96	439	9,6



Tuotemerkinä

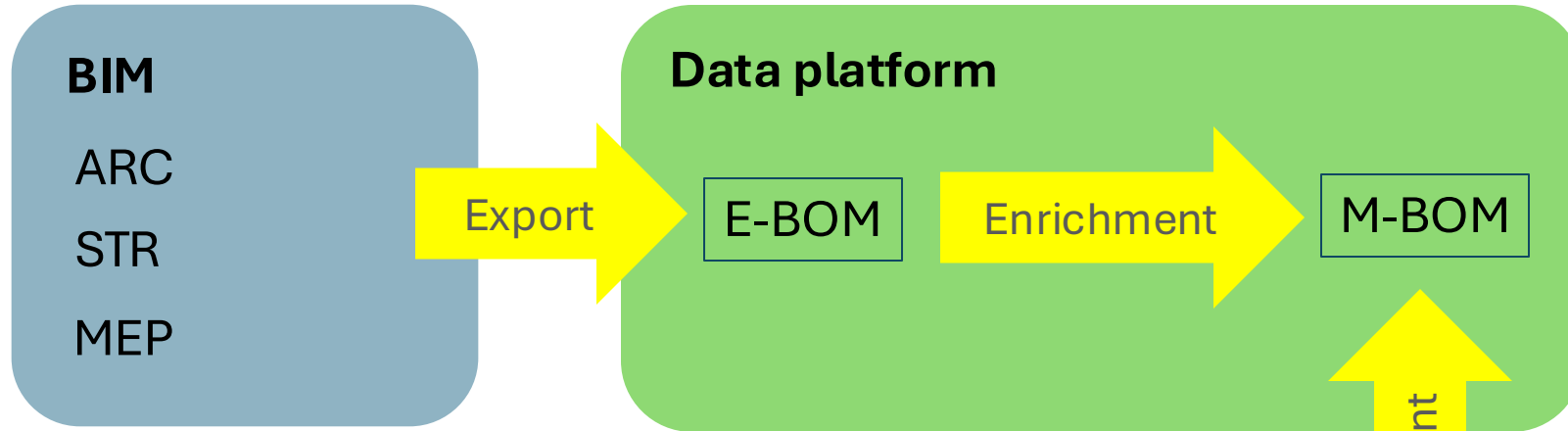


Esimerkki: NTK 500/250

Semantic enrichment of MEP product data (IFC → E-BOM → M-BOM)

Problem:

Downstream processes, organisations, and stakeholders need more information than they get nowadays, also, in the correct format.



1. We can model new objects

2. We can improve the content of objects

3. We can enrich the data by rule-based that can be also automatised

4. We can add new information by using agreed definitions

Installation materials

Result:

Downstream processes, organisations, and stakeholders get needed information, also, in the correct format.

Conclusion

- There is a need for information management
 - Takt production has become more common, and its model has evolved to handle more detailed product information, and to utilise DfM (Design for Manufacturing) principles.
 - External pressures, such as monitoring for EU directives, require a reliable information flow from design to other phases.
- BIM has currently a secondary role in projects
 - Projects rely on 2D drawings
 - Common data environment (CDE) might be used, but mainly for file transfer
- Not digitisation, but digitalisation
 - BIM data as the foundation for information
 - Need for machine readable data and data platform

What is next?

- Information management requires a systemic change. Thus, the life cycle and various stakeholders must be taken into account.
- The shared data and technologies should be further analysed and technicalities (e.g. methods, formats) for sharing data agreed on.
 - For example, M-BOM integration with construction schedule, PEPPOL etc.

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Thanks for your attention!

Questions?

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A!
Aalto University