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GREENCASTING

GREEN CASTING LIFE – Final Seminar: Sustainable Solutions for Foundries

ODLEWNIE POLSKIE S.A.

Odlewnie Polskie S.A. flagship foundry in Poland

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Idea of the LIFE GREEN CASTING

1. Foundry localization;
2. Specifics of work;
3. Odors of technological processes;
4. EU requirements.

Aims in Life project for inorganic technology

1. Verification of possible changing technology of molding in boxless line. Switching from pepset to inorganic.
2. Production of molds in flask less line in the inorganic technology.
3. Testing in serial production of parts in the inorganic technology.
4. Verification of possibilities of mechanical reclamation inorganic mass.
5. Serial production of casting made with ductile iron in inorganic technology in the closed circle.

Instalation made in OPSA

1. New molding line dedicated to the inorganic technology, with mikser 10T/h.
2. New reclamation line dedicated to the inorganic technology.

Molding line

Regeneration

Test performed at boxless line in OPSA

1. Molding technology: Sand Team, Peak, Vesuvius.
2. Coating of the mold and cores.
3. Life time, stripping time, handling and storage.
4. Influence of the enviromental: temperature, moisture.
5. Gass emisions and it smell.
6. Quality of the castings: Surface, defects and geometry.
7. Reclamation and closed cycle of production.
8. Costs of the technology ☺

Sand mixture no.	Sand mixture composition				Bench life, min	Stripping time, min	Stripping of mould*, min	Flefural strength, MPa	Temperature		Mould Housing	Comment	Date
	New silica sand Grudzeń Las 0,28-0,30	GEOPOL 620 A binder	GEOFIX hardener					OPSA lab	Sand, °C	Foundry, °C			
1	100%	3,00	GF00+GF03	6+12%	5 / 6	11 / 14	14	After 24 hours: 1,3 / 1,7 / 1,5 MPa	24,5	26,3	Bottom + top half	Manual hardener	9.7.2024
2	100%	2,50	GF00+GF03	6+12%	5	10	19	---	24,5	26,3	Bottom + top half	No sand! Only bottom half.	9.7.2024
3	100%	2,50	GF00+GF03	9+9%	3 / 4	9 / 7	12	After 24 hours: 1,4 / 1,2 / 1,35 MPa. After 48 hours: 1,2 / 1,35 / 1,30 MPa.	34,3	26,3	Bottom + top half		9.7.2024
4	100%	2,50	GF00+GF03	18+0%	8 / 8	13 / 12	14	After 24 hours: 1,0 / 1,12 / 1,1 MPa.	34,3	26,3	Bottom + top half		9.7.2024
5	100%	3,00	GF00+GF03	18+0%	9 / 7	19 / 14	27 / 17		32,0	26,1 – 32,0	Bottom + top half		10.7.2024
6	100%	3,00	GF00+GF03	18+0%	8 / 8 / 7	17 / 13 / 18	15 / ?		32,0	26,1 – 32,0	Bottom + top half	Double mixer output!!! Blocking of the mixer!!!	10.7.2024
7	100%	3,0	GF00+GF03	12+6%	4 / 8	10 / 8	12		32,0	26,1 – 32,0			10.7.2024
8	100%	3,0	GF00+GF03	14+2%	---	---	---	After 24 hours: 1,3 / 1,4 / 1,4 MPa.	32,0	26,1 – 32,0	Bottom half		10.7.2024
9	100%	3,0	GF00+GF03	12+2%	6	13	18		33,5	28,5	Bottom half		11.7.2024
10	100%	1,8	GF00+GF03	12+2%	3	17	20		32,0	26,1 – 32,0	Bottom half		11.7.2024
11	100%	3,00	GF00+GF03	16+2%	10	13	14	---	31,7	28,5	Bottom half mould	Manual hardener	11.7.2024
12	100%	3,00	GF00+GF03	16+2%	6	12	20	---	---	28,5	Bottom half mould	Manual hardener	11.7.2024
13	100%	3,50	GF00+GF03	14+2%	6	12	14	0,5 / 0,6 / 0,5 / 0,6 MPa	---	28,5	Bottom half mould	Manual hardener	11.7.2024
14	100%	2,00	GF00+GF03	15+5%	4	9	11	---	32,3	28,5	Bottom half mould	Autoblend	11.7.2024
15	100%	2,00	GF00+GF03	15,9+4,1%	5	9	11	---	34,0	28,5	Bottom half mould	Autoblend	11.7.2024

Surface with out coating

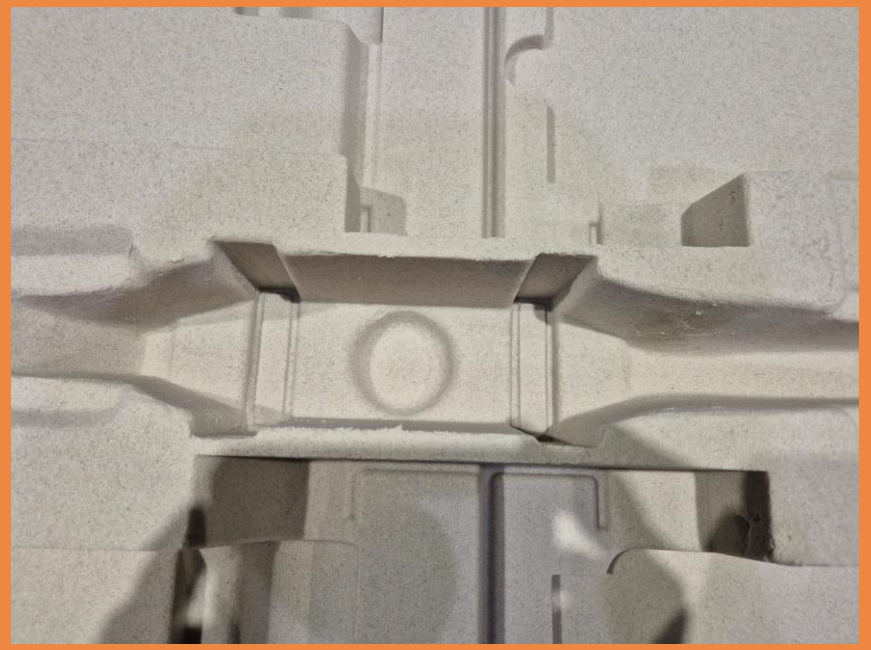
Surface with coating

Surface with coating

- **Moulds was cracking and breaking at the molding area and during the transport**

Veryfication of material used for models and pattern plate.

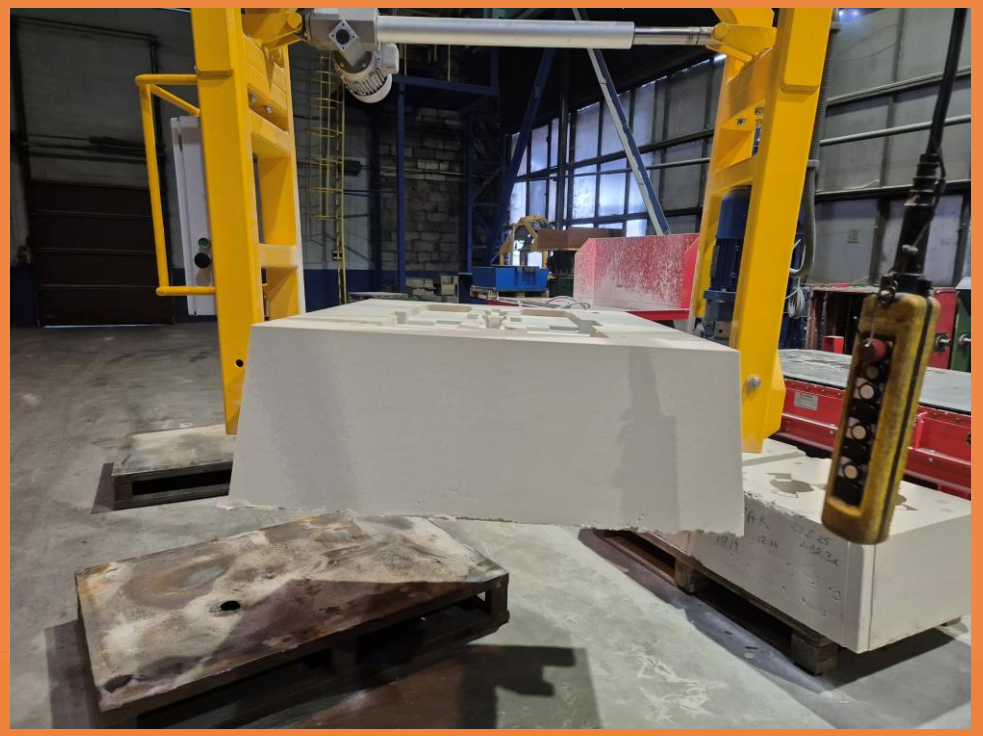
Wood and resin -OK. It’s possible to make the molds in low temp.



Veryfication of material used for models and pattern plate.

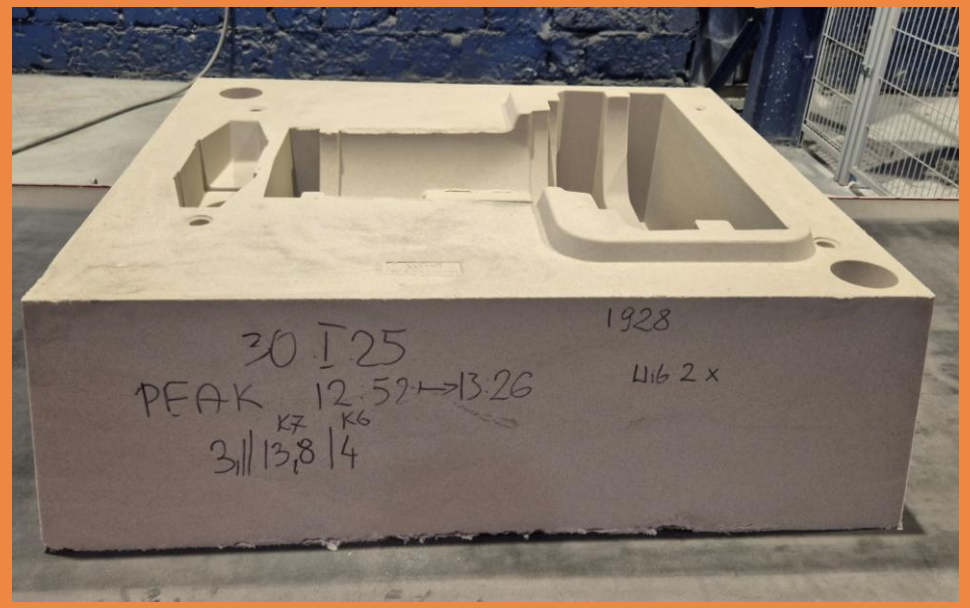
Aluminium or steell it’s NOK. With this material is not possible to make the molds in low temp. Even when pattern ware warmed.

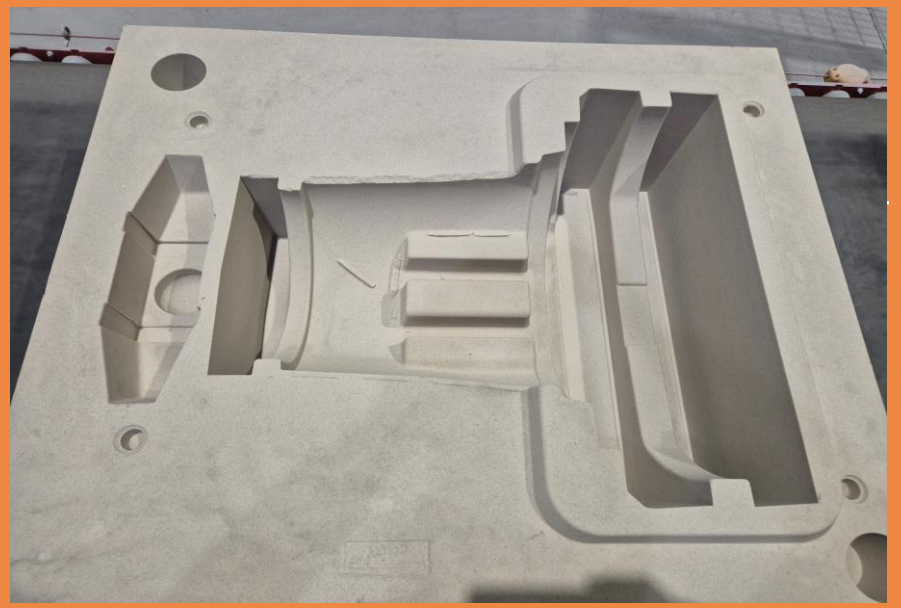
Handling and lifting

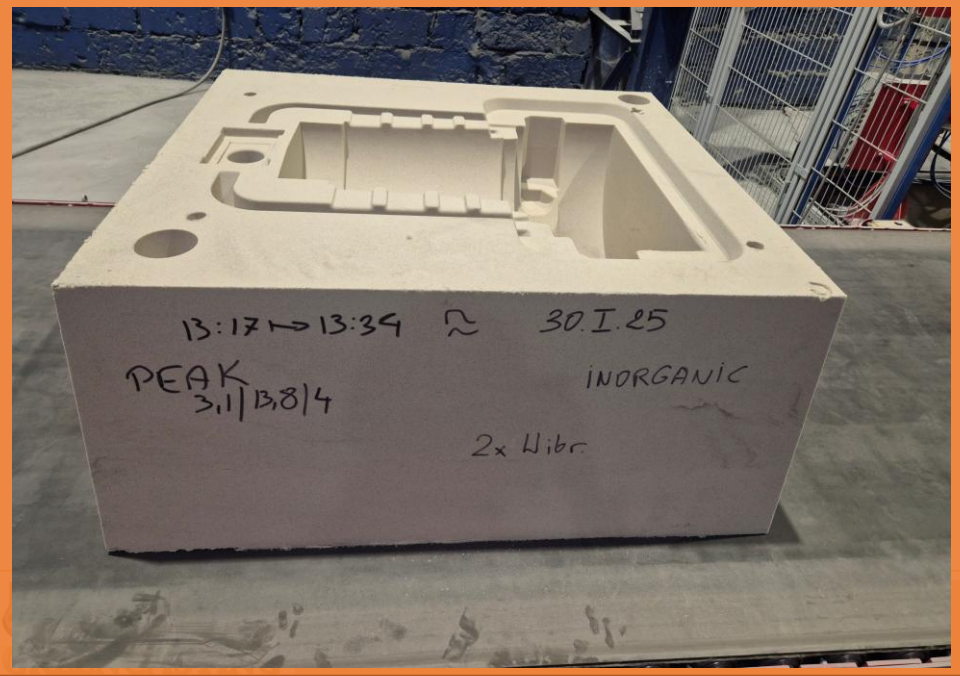


Life time, Bench and stripping time, handling and storage

Life time, stripping time, handling and storage

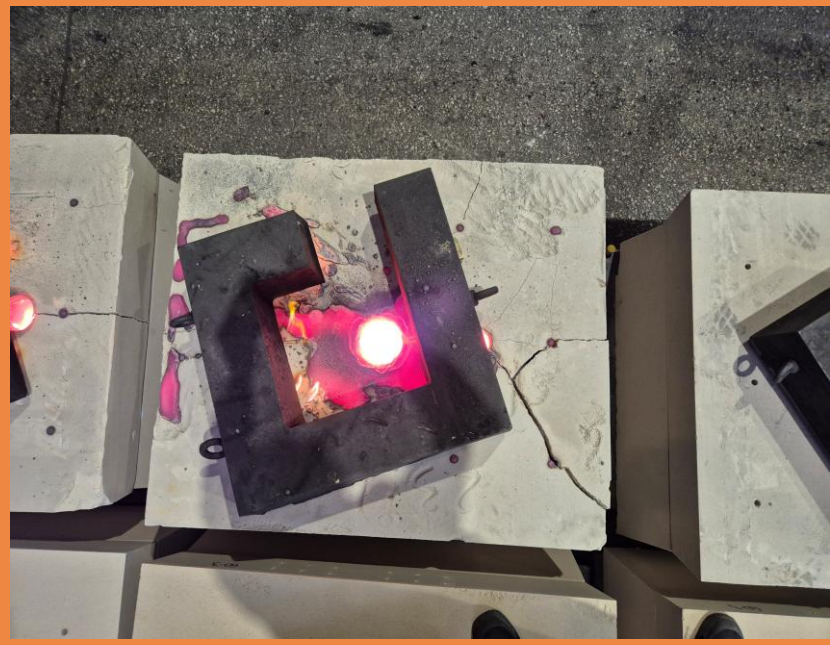


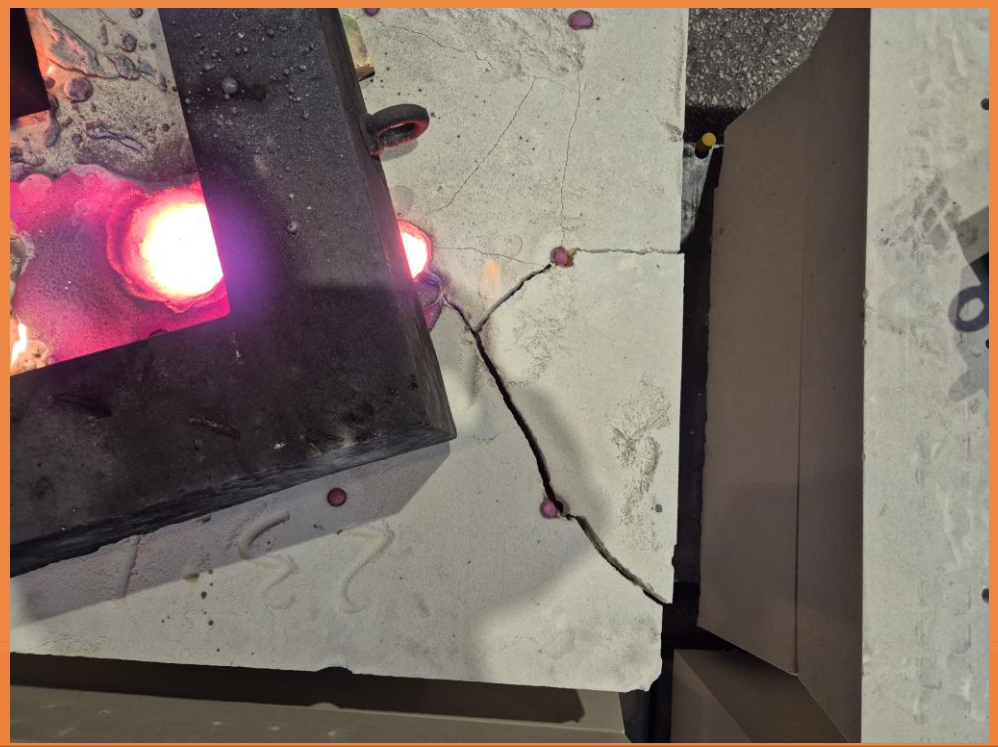


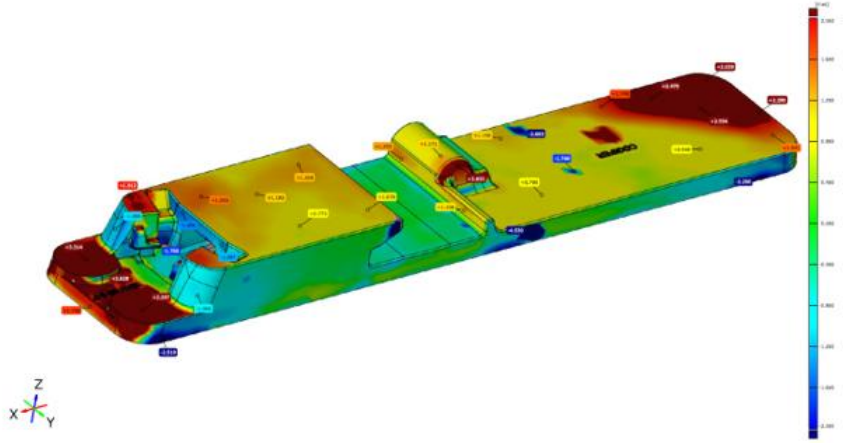


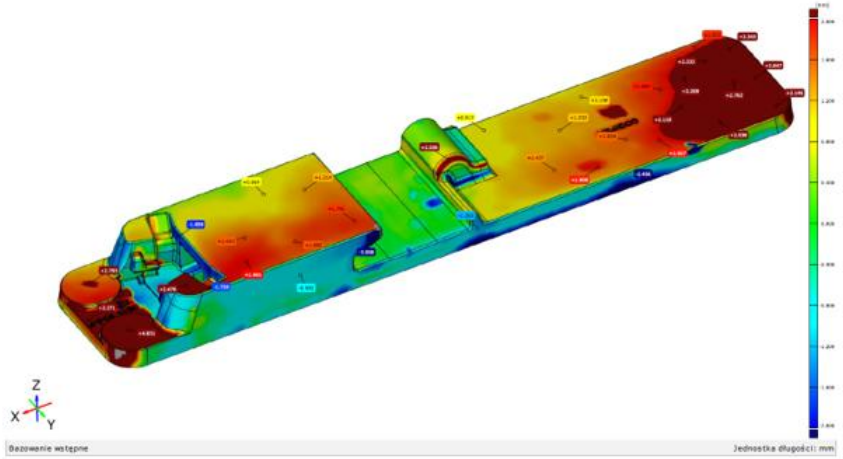
Pouring and Gass emisions

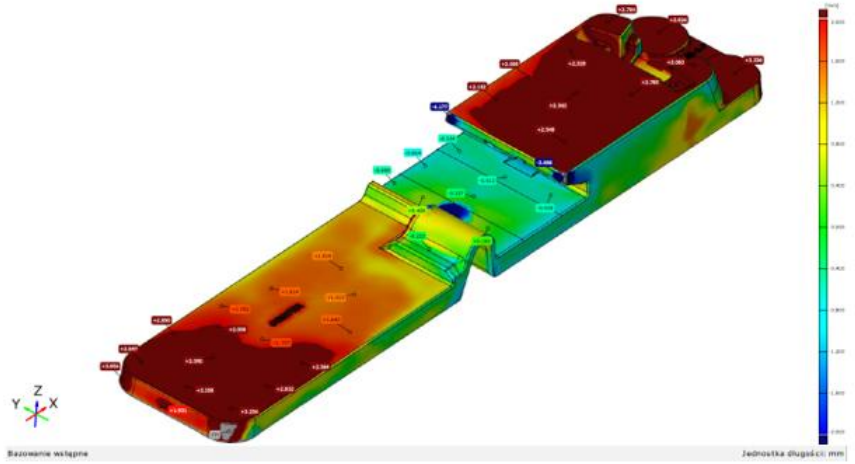
Strength of forms



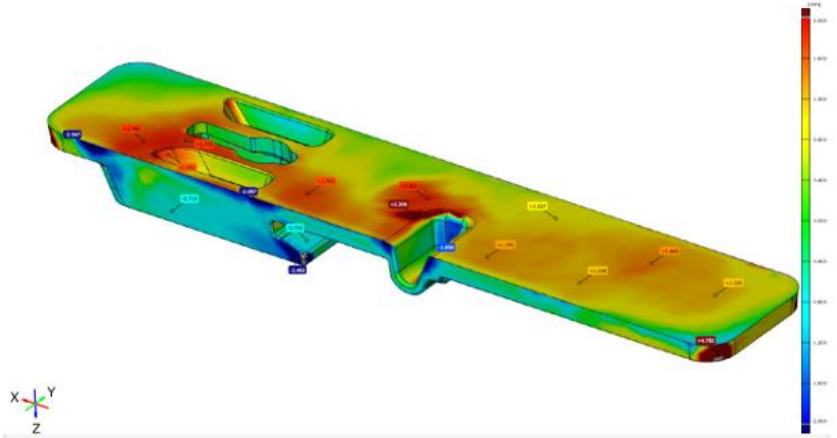


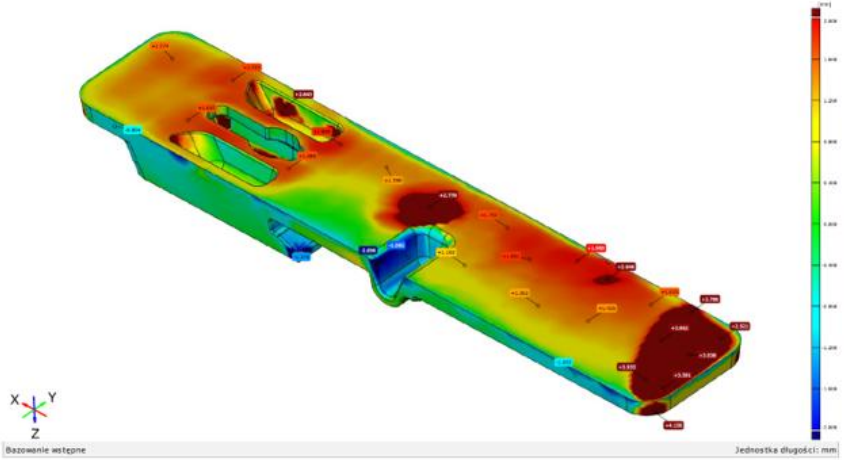


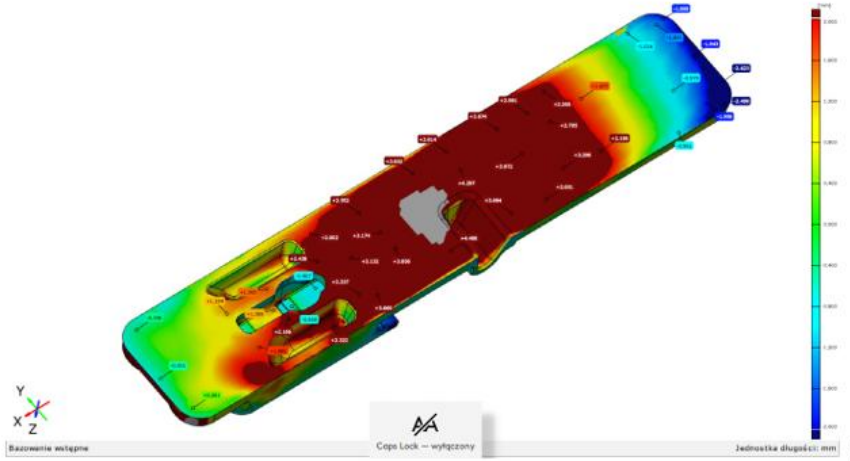




SCAN RESULTS 1

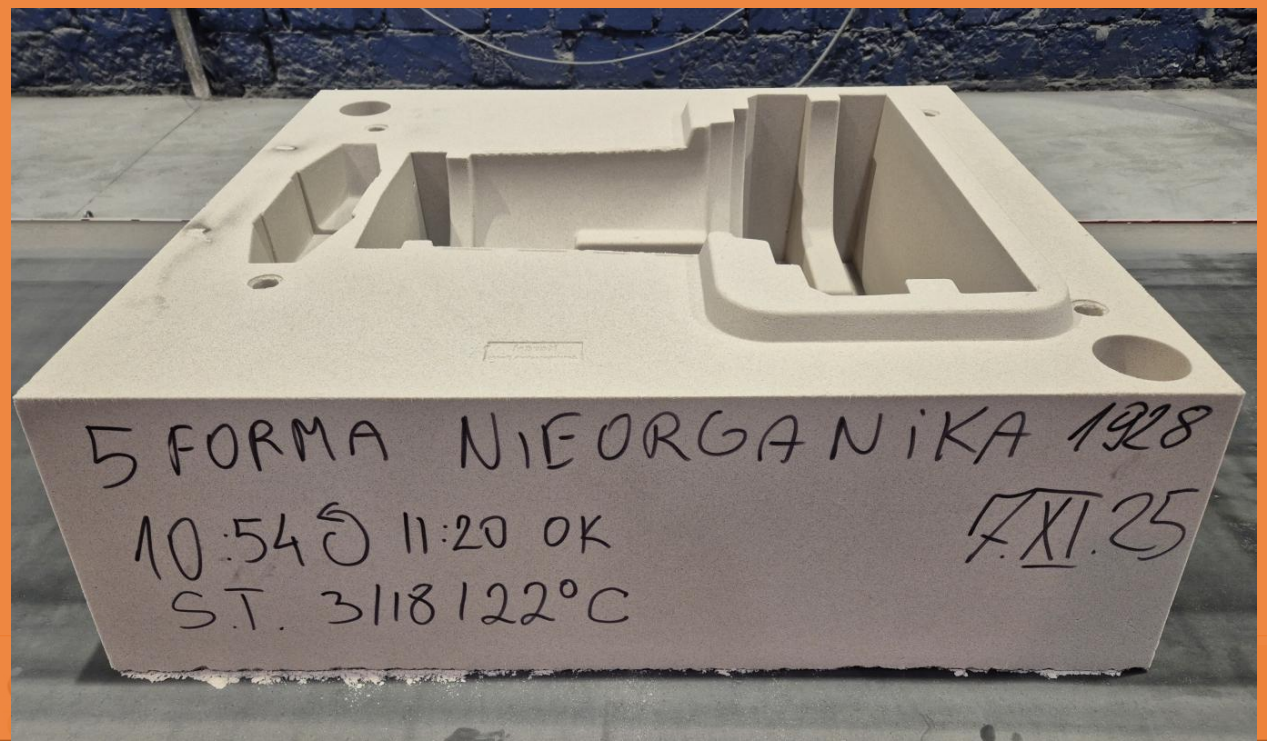


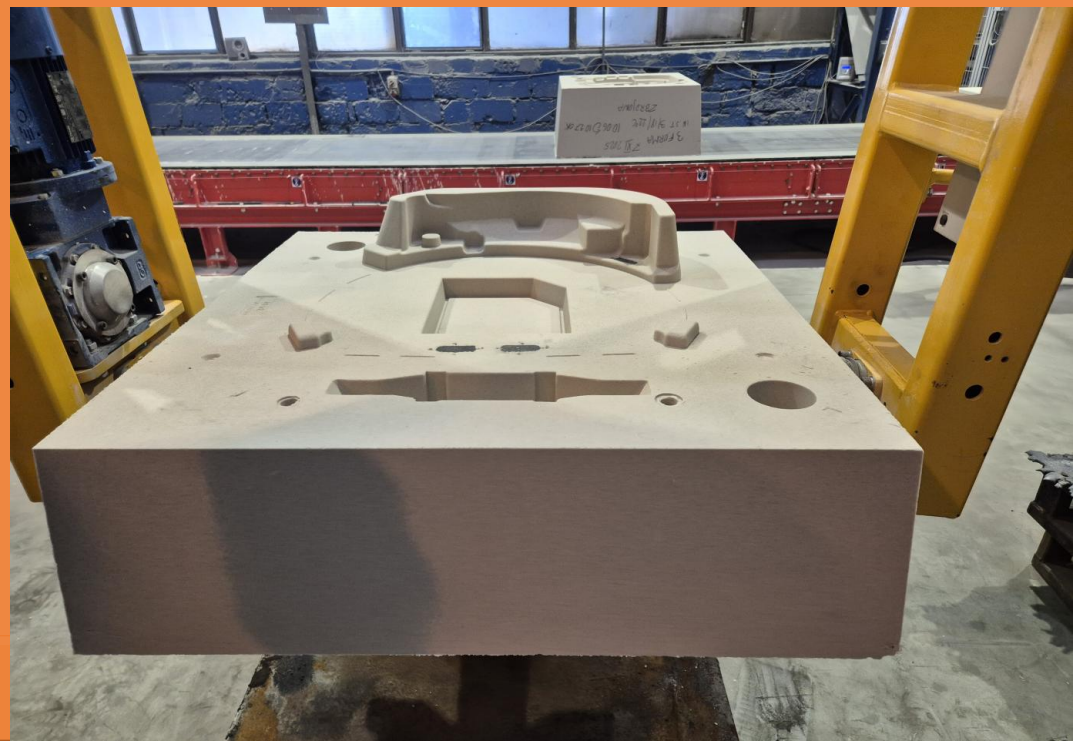




SCAN RESULTS 2

1. In OPSA for serial test we chose 3 types of parts (housing).
2. Test ware made in last month of 2025.
3. In all of the moulds we add reinforcment rod to compensate low strenght of the moulds. There was low air temperature 8 °C but sand temperature was 25°C. Results at next slide
4. We casted 15 moulds with out any leakage and other issue.





Lp	Molding mas	Binder	Hardener		Life time min	striping min	Lifting and Handling min	Bending stress, MPa			Temp		Type of mold
	Piasek Grudzeń Las 0,28-0,30	Sand Team 820 binder %	Hardener SGU121 %	SGU121 %				after 1h	after 3h	Po 24h/48h	Sand, °C	Enviromental, °C	
1	100%	3	9	9	15	20	35	1,0 1,1 0,8	1,4 1,2 1,5	1,0 / 1,2 1,3 / 1,2 1,2 / 1,3	22	6	Gearbox housing
2	100%	3	9	9	15	18	30	0,3 0,2 0,3	1,3 1,2 1,5	1,2 / 1,2 1,5 / 1,3 1,4 / 1,4	25	8	Railroad tie
3	100%	3	9	9	15	20	35	0,5 0,4 0,5	1,1 1,3 1,3	1,3 / 1,2 1,3 / 1,2 1,1 / 1,3	24	8	Railroad tie
4	100%	3	9	9	15	20	30	0,3 0,4 0,6	1,0 1,2 1,3	1,4 / 1,5 1,3 / 1,4 1,3 / 1,2	25	8	Gearbox housing
5	100%	3	9	9	15	15	35	0.3 0,4 0,6	1,2 1,0 1,3	1,4 / 1,2 1,3 / 1,2 1,3 / 1,3	25	8	Gearbox housing

Conclusion

1. This technology is very sensitive and promising but have to be dedicated to the foundry.
2. Low emission of the gasses, smell of the technology (water vapor).
3. Very Low content of oragnic substances.
4. Possible to make the „hybrid” technology. Molds made from the Inorganic with alkohol coating and organic cores – results less emission at min. 70%
5. Bigger risk of breaking/cracking molds and leakage from the molds with out boxes wit-out using reinforcing rods.
6. Higher risk of the deformation shape of the castings.

Thank You ☺