

Nº 179335

Desenvolvimento de um equipamento para avaliação do intemperismo sob pressão para aglomerados de minério de ferro

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PROIBIDO REPRODUÇÃO

DEVELOPMENT OF EQUIPMENT TO ASSESS WEATHERING UNDER PRESSURE FOR IRON ORE AGGLOMERATES

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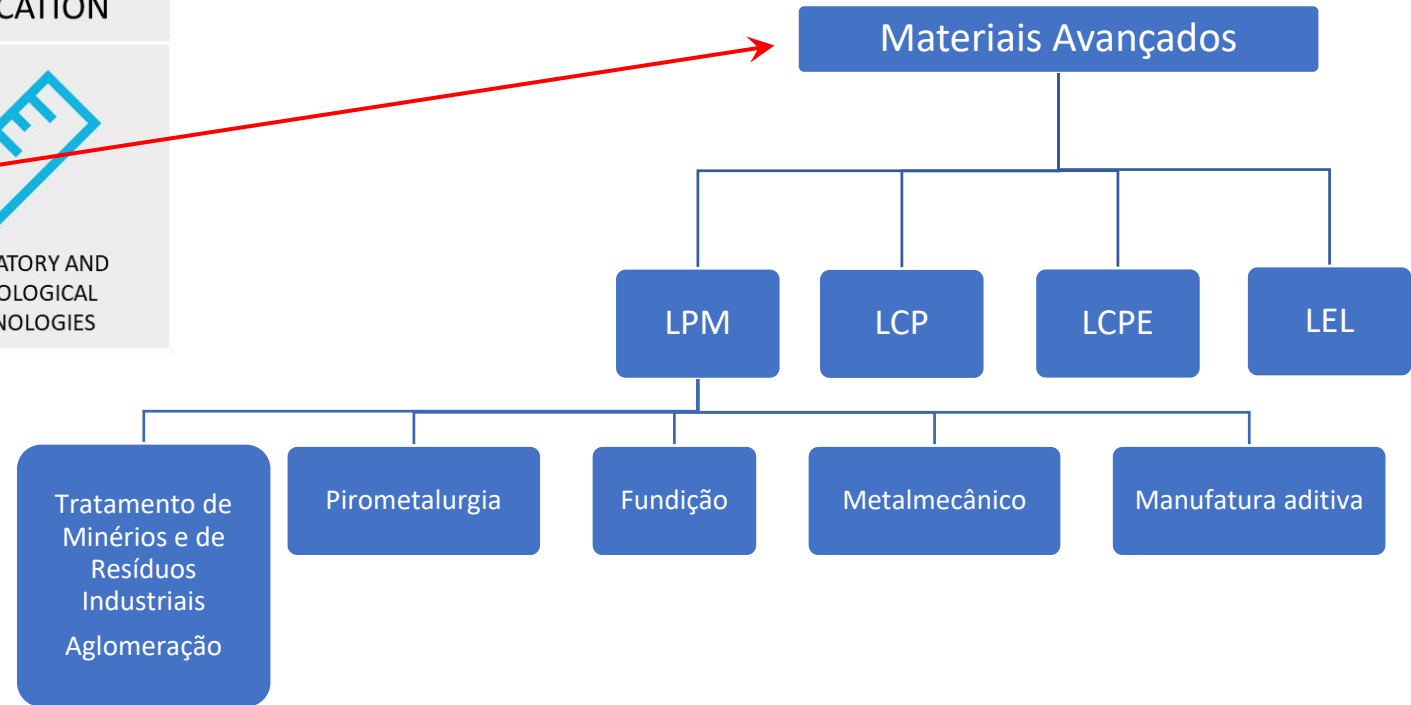
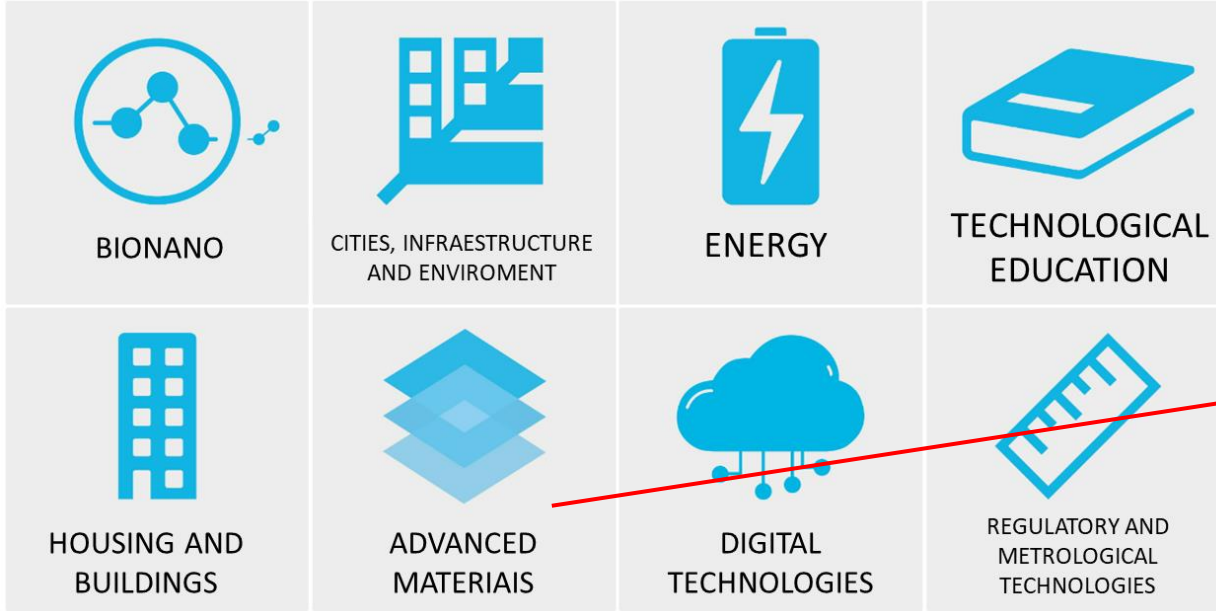
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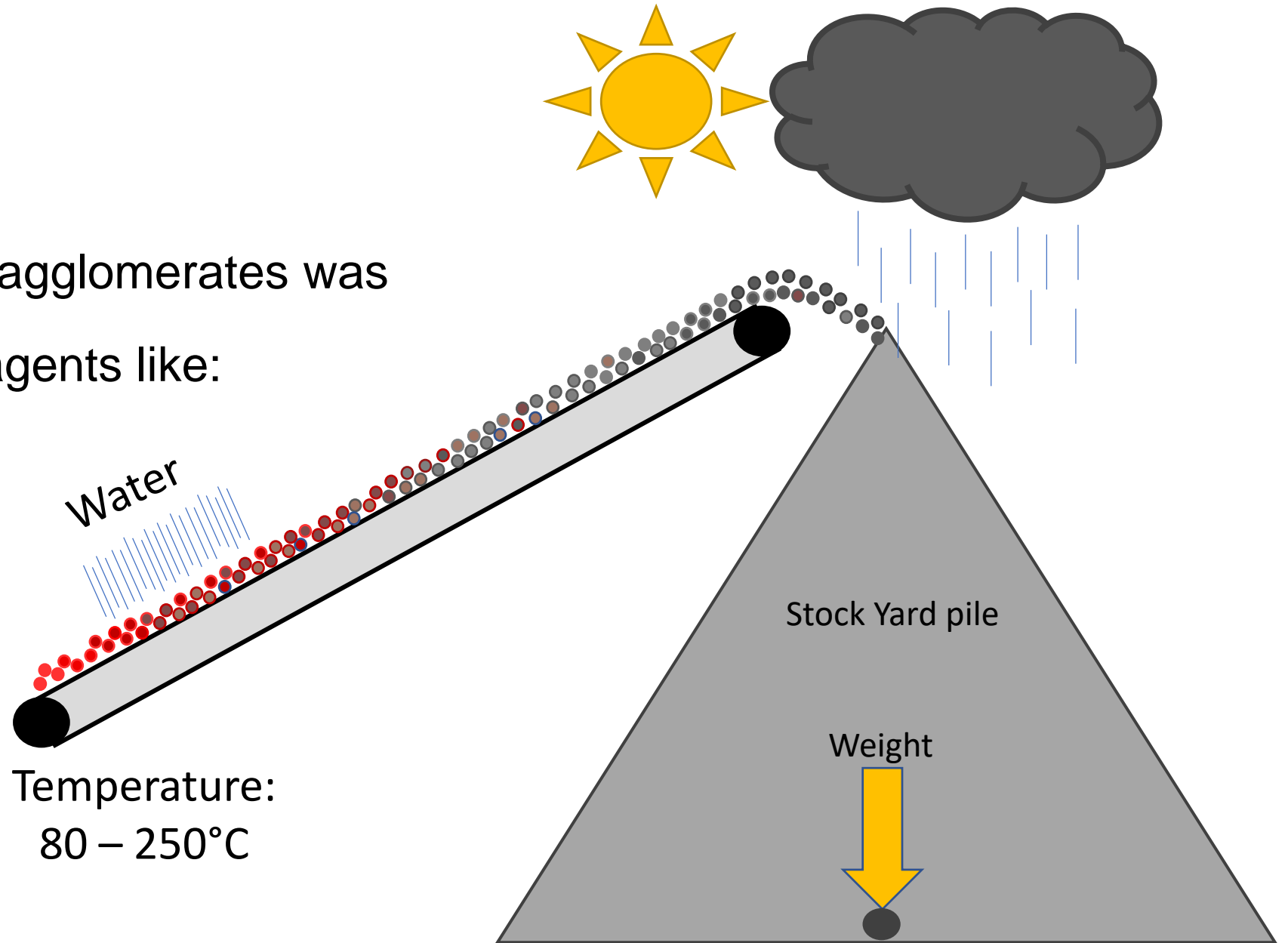
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Weathering

In logistics operation agglomerates was exposed to external agents like:

- ✓ Rain / Water;
- ✓ Pressure;
- ✓ Temperature;
- ✓ Drainage water;
- ✓ Thermal Shock;

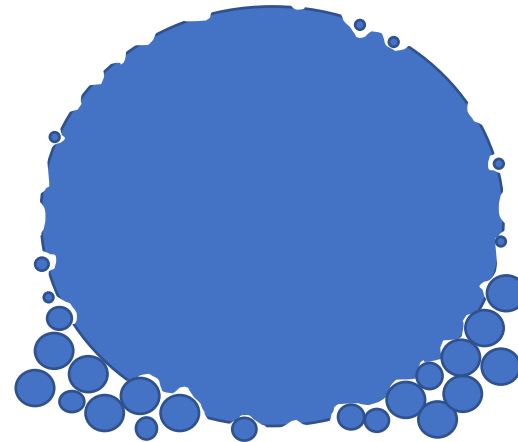
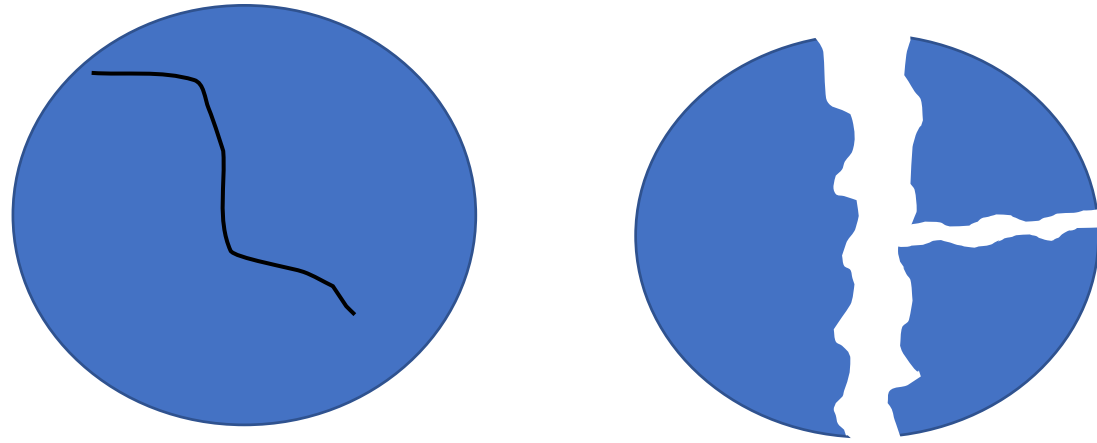


Source: Author

Impact

External factor cause:

- ✓ Cracking
- ✓ Breaks;
- ✓ Abrasion and Fines generation;
- ✓ Resulting in Bad quality

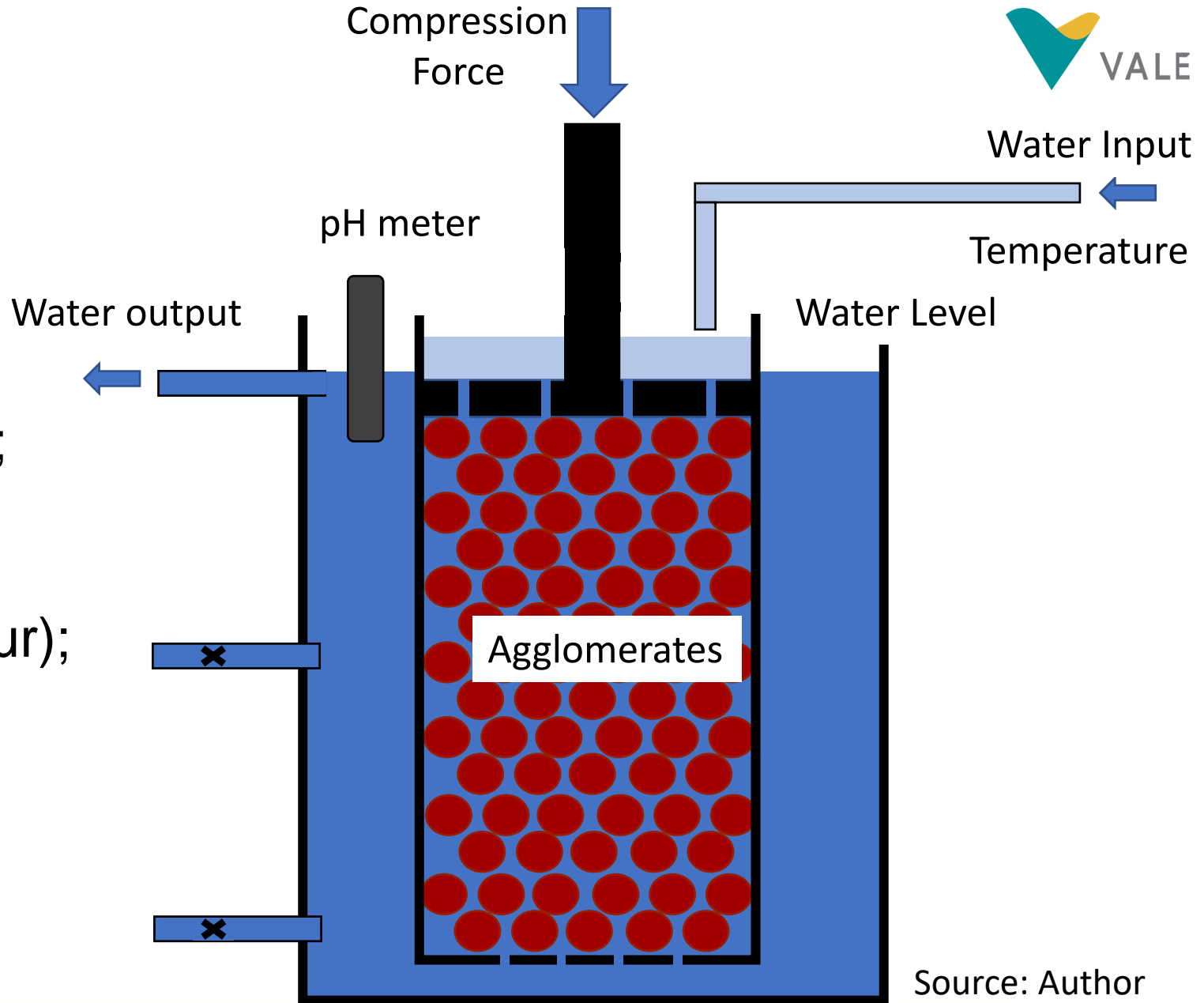


Equipment

Capabilities:

- ✓ Force (0-10000 N);
- ✓ Temperature (5 – 45°C)*;
- ✓ Water Level (3 levels);
- ✓ Water flow(5-20 liters/hour);
- ✓ pH*;
- ✓ Time (1h - 40 days);

- Not fully implemented



Source: Author

Design of Experiment - Fractional Factorial: 4 factors, 2 levels with 1 central point

Factors	Level High	Central Point	Level Low
Temperature	25°C	35°C	45°C
Time	6 hours	15 hours	24 hours
Water Flow	5 l/h	12.5 l/h	20l/h
Stack Height	20 meter	15 meters	10 meters
Force	10,000N	7,500N	5,000N

Design of Experiment - Fractional Factorial: 4 factors, 2 levels with 1 central point

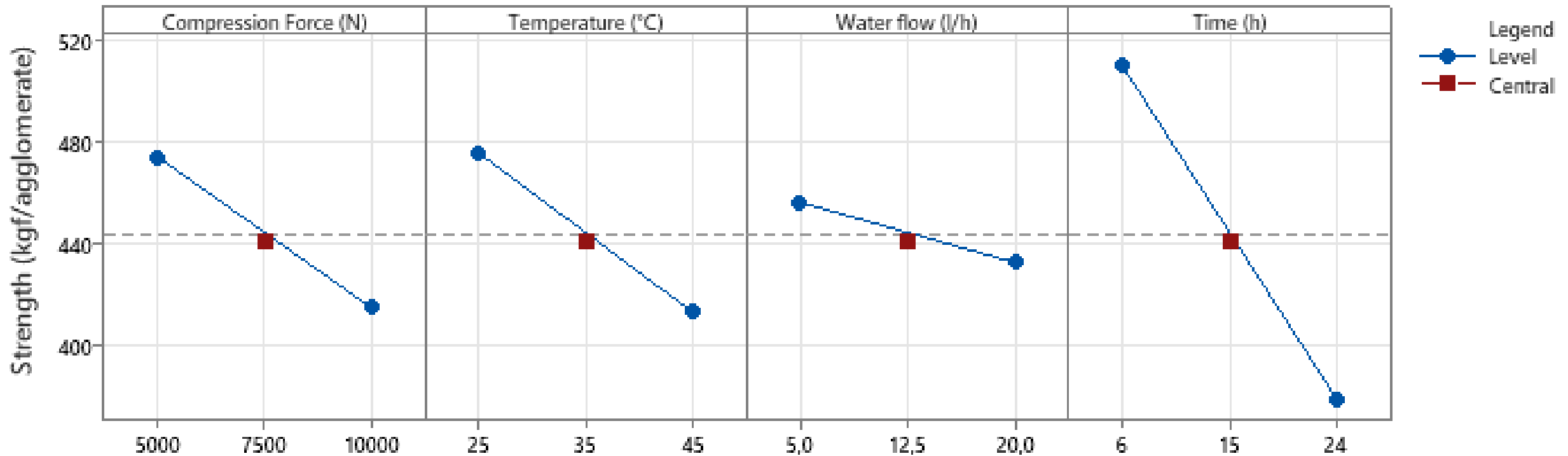
Sequence	Force(N)	Temperature (°C)	Water Flow (l/h)	Time (hours)
1	5000	45	20	6
2	10000	25	5	24
3	10000	45	5	6
4	10000	25	20	6
5	5000	45	5	24
6*	7500	35	12,5	15
7	5000	25	20	24
8	10000	45	20	24
9	5000	25	5	6

* Central Point

Source: Author

Results

Main Effects Adjusted Average



Source: Author

Conclusions

- ✓ Time is the most important factor;
- ✓ This indicating that degradation processes occur slowly;
- ✓ Compression force and Temperature are also important factors;
- ✓ Temperature likely accelerates degradation kinetics, amplifying its effect;
- ✓ Compression force appears to create cracks, increasing reaction area and enhancing degradation;
- ✓ This initial exploratory study focused on main effects without assessing variable interactions;
- ✓ Future research may explore these interactions newly identified factors.



Thanks!



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