Chemical™ Concepts
Our expertise is your solution.
chemical-concepts.com
800.220.1966
410 Pike Road • Huntingdon Valley, PA 19006

CHEMFORCE

Case Study: Enhanced Drilling Performance with Complex42™

Project	91 x 7-8 m deep 600mm Cores
Substrate	Up to 300MPa Basalt
Location	6 Cross St Footscray Melbourne
Date	July 9th, 2023, to August 15th, 2023
Company	Access Excavation
Engineers	Joel & Kyle Dazenko
Email	info@accessexcavation.com.au
Website	www.accessexcavation.com.au
Drill Rigs	HPM 100J, IMT A140
Drill Bits	600mm Core Drill, Betek TCT Teeth

Summary of results **IMT A140** drill rig using 0.8% Complex42™

79.6%
Less Teeth consumed per hole

43.7%
Less fuel consumed per hole

27.4%
Faster drilling time

Summary of results **HPM 100J** drill rig using 0.8% Complex42™

69.8%
Less Teeth consumed per hole

39.6%
Less fuel consumed per hole

26.5%
Faster drilling time

Parameter	IMT 140 (Water Only)	IMT 140 (Complex42™)	HPM 100J (Water Only)	HPM 100J (Complex42™)
Avg. Duration/Hole	256 minutes	188 minutes	277 minutes	201 minutes
Avg. Fuel Consumed/Hole	114.47 Litres	69.11 Litres	121.13 Litres	68.09 Litres
Avg. Drill Teeth/Hole	8.83	2.66	9	1.83

Project Details:

- A construction site for mixed-use development by Valeo saw 91 600mm piles drilled.
- Ground composition: Predominantly basalt with strengths up to -300 MPa.
- The site was located on Quaternary aged basaltic deposits.

Methodology:

- Equipment: IMT 140, HPM 100J
- Measurements: Duration of drilling, fuel consumed, and number of drill teeth used per hole.

Key Findings:

1. *Fuel and Operational Efficiency: Based on a diesel price of $2.09/Litre*
   Savings of approx. $95.05 and $110.07 per hole for IMT 140 and HPM 100J respectively when using Complex42™. Distributed across 91 holes, potential fuel cost savings amount to approx. $9,332.96.
2. *Labour Saving: Based on a wage of $50 / hour*
   Saving of approx. 69minutes and 76minutes per hole for IMT 140 and HPM 100J respectively when using Complex42™. Distributed across 91 holes, potential labour cost savings amount to approx. of 6,597.5 minutes or 109.9 hours x $50 for a total saving of $5,497.90
3. *Teeth savings: Based on $18.40/tooth*
   Saving 6.17 and 7.17 per hole for IMT 140 and HPM 100J respectively when using Complex42™. Distributed across 91 holes, potential tooling cost savings amount to approx. 607 teeth x $18.40 = $11,168.25
4. Tool Wear Reduction:
   Significant reduction in wear on drill barrels' hard facing with Complex42™.
   Using traditional methods, hard facing would typically last 2-3 days in hard basalt. With Complex42™, the HPM 100J drilled up to 252.6 meters and the IMT 140 achieved a depth of 355.7 meters with only one changeover. The total cost for traditional methods would be: (8 + 11) barrels × $250 = $4,750
   Hard facing savings amounted to $4,500.

Total Savings: $30,499.11

Complex42™ Consumption and Cost:
- Consumption: About 2.40 liters of Complex42™ per hole.
- Cost per hole: $26.52.
- Total cost for 91 holes: Approximately $2,413.32.
- Total Savings: $30,499.11
- Total savings from using Complex42™ across 91 holes: Approximately **$28,085.79**

Environmental Impact:
As evidenced by our empirical data, there was a marked reduction in fuel consumption per hole when using Complex42™. Specifically:
IMT 140: An average reduction of 45.36 litres per hole
HPM 100J: A average reduction of 53.04 litres per hole
Considering the combined average fuel consumption reduction per hole is approximately 49.2 litres, and given the number of holes drilled, this translates to a whopping 4,477.2 litres of diesel saved across 91 holes.

Environmental Implication: Diesel combustion is a significant source of CO2 emissions. On average, burning one litre of diesel emits 2.68 kg of CO2. Thus, the fuel savings translate to a reduction of approximately 12,000.93 kg of CO2 emissions over the course of the project.

Discussion:
Complex42™ enhanced the drilling efficiency, particularly in hard materials, reducing the friction and allowing for smoother operations. The addition of Complex42™ significantly reduced the wear on drill barrels' hard facing, leading to cost savings, and amplified operational efficiency.

Conclusion:
Complex42™ offers numerous benefits in piling and rock drilling, including reduced costs, increased equipment lifespan, and fuel efficiency. Its use emphasizes a commitment to sustainability, marrying industrial efficacy with eco-friendliness.