



Product Presentation

Applicant Name: Nano and advanced materials institute

Product Name: Self-Compacting Backfill Material

Specification: The product is highly flowable, self-compacting, and self-levelling backfill material.



- **Core Functions:** Highly flowable, self-compacting, excavatable and thermally conductive
- **Technology used:** Formulation of advanced materials
- **Construction Process involved:** Backfilling in civil engineering works
- **Key improvement in Construction Process:**
 - **Productivity**
 - **Quality**

Job Reference:

MTR Shatin To Central Link, 28-29th Nov. 2019, Trial

HY/2018/02 - Central Kowloon Route - Kai Tak East, 2nd Sep. 2020-2nd Apr. 2021, Trial

HyD Lighting Division Tai Pak Tin Street, Kwai Chung, 15th-16th Dec. 2020, Trial

HyD Lighting Division Pak Tai Street, To Kwa Wan, 13th-14th Jan. 2021, Trial



Innovative Features

- **Core Technology:** Highly flowable, self-compacting, and self-levelling backfill material
- **Launch date:** 04/21
- **Awards:** Silver medal, 2019 Exhibition of Inventions Geneva
- **Patent:** THERMALLY-CONDUCTIVE, LOW STRENGTH BACKFILL MATERIAL, USPTO 62853732, HK30020754, CN337127996
- **Comparison with current practice:**

Parameter	This Product	Current practice
Compaction	Self-compacting	Mechanically layer-by-layer
Flowable	Highly flowing, slump value >200 mm, can be pumped	Dry material, hence, doesn't flow
Strength	28 d compressive strength < 1 Mpa, excavatable by hand tools	Depends on level of compaction, excavatable by hand tools
Thermal conductivity	Thermal conductivity 1.1 W/mK	Depends on soil composition, humidity and level of compaction



Adoption example

MTR Shatin To Central Link, To Kwa Wan Station entrance works

- **Function in this project:**
Flowable backfill was used to fill the utility trench around and above the drainage conduit



Trench before backfilling
size: 4.0m*1.16m*2.3m



Filling with NAMI backfill materials



After finished the filling



Trench after overnight



Removing sheet piles



Filling the subbase



Pavement opened to public in April 2020

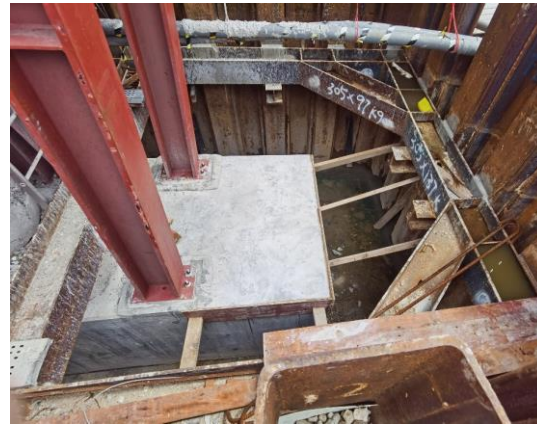


Adoption example

Highway Major Works, Central-Kowloon-Route (CKR), Kai Tak East HY/2008/02



Total of **18 m³** of material was used to backfill the space between ELS and footbridge pile.



Excavation before backfilling



Excavation after backfilling

- **Function in this project:** Flowable backfill was used to fill the areas between the concrete foundation works and lateral supports



Total of **33 m³** of material was used to backfill the space between ELS and retaining wall.



Excavation before backfilling



Excavation after backfilling

Benefits – Productivity & Quality



Traditional method of backfilling of soil by mechanical compaction in layer-by-layer method



New method of backfilling by direct pouring of self-compacting backfill product

- **Improves quality:**

1. 100 % reduction of errors during compaction
2. 100 % improvement in workmanship as material composition is uniform throughout backfilled area

Productivity comparison

Backfill trial at CKR (72 m ³)	This Product	Soil
Placement	Pouring from a concrete truck	With excavator
Compaction	Self-compacting	300 mm layers over a depth of 1.2 m
Time until completion	4 hours for placement + overnight to reach early strength	10 hours for placement + 10 days of sampling and testing compaction quality
Man-days	1.5 days	11.25 days



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