The field part of the seminar in the Miastko Forestry Inspectorate

Project Details

COMPANY

LafargeHolcim

COUNTRY

Poland

AUTHOR

Krzysztof Bambynek

Maciej Czapski

Łukasz Ludwisiak

Sylwester Sroka

CONTACT INFORMATION

Jim Rushworth, Vice President Environment & Public Affairs Quarries, Aggregates & Concrete

jim.rushworth@lafargeholcim.com

Restoration of the Sępólno Gravel Pit

CONTEXT

LafargeHolcim (The Group), a world leader of building materials, operates in 64 countries. Operations in Poland include more than 60 production sites and 1,500 employees. The Group's three primary activities are cement production, concrete production, and extraction of aggregates to supply the building and public works markets which include housing, road, railways, and related infrastructure.

The Group places innovation at the heart of its strategy, with three main axes considered in their operations: 1) improve energy efficiency, 2) reduce the carbon footprint, and 3) reduce the environmental footprint. This is accomplished by preferential use of sustainable fuels and raw materials. A registered sustainable builder, LafargeHolcim is highly involved in the protection of the biodiversity.

The rehabilitation process typically used for sand and gravel deposits is to seed the land with lupine and apply artificial fertilizer to encourage regrowth. This process has proved expensive and ineffective. LafargeHolcim contracted the Warsaw University of Life Sciences (WULS-SGGW) to develop and implement an innovative method of post-mining area restoration—namely, the management of topsoil and use of biomass created during the felling of the trees. This method restores the land more quickly and reduces land lease cost.

The Sępólno sand and gravel deposit is located on lands managed by the State Forests National Forest Holding, therefore the team required both approvals and partnership with that organization.

OBJECTIVE AND PROJECT OVERVIEW

The purpose of the project was to develop a more effective method to restore the landscape following mining activities, and to reduce costs of land lease. A broader goal was to develop superior rehabilitation techniques.

THE BUSINESS CASE

There were several benefits of this project:

- **Environmental Benefits:** using trees planted in naturally enhanced soil rehabilitates the land more quickly than lupine planted in artificial fertilizer. In addition, it better maintains the characteristics of the soil, and therefore the biodiversity of the area including mycorhizzal fungus and native reptiles.
- **Economic Benefits:** Significant savings per annum as a result of a faster turnover of the plots of land to the lessor (within a year), and the reduction of the area used for business activity. Compared with lupine-based application, the new approach gives 1 to 1.5 years of curtailment in land lease.

- **Maintain License to Operate and Social Responsibility Benefits**: The State Forests National Forest Holding, which manages the land. The Group leases was previously unsatisfied with the standard rehabilitation method. The improvement and the dissemination of the new reforestation method was crucial for presenting LafargeHolcim as an entrepreneur that understands and complies with sustainable development principles. This distinguishes LafargeHolcim from numerous competitors, and demonstrates a desire to maintain productive relationships with stakeholders. In addition, an ongoing cooperation with WULS-SGGW and other academic units gives LafargeHolcim expertise to apply this reforestation technique at other sites.

DECISION MAKING PROCESS

The Group coordinated with the The State Forests National Forest Holding, local government, and WULS; the stakeholder meeting convened by LafargeHolcim and WULS involved local government and the Forest Authority. The stakeholder meeting included a field visit to discuss improvements to the rehabilitation method.

Land Management was involved in the internal decision-making process with full support of The Group's CEO from the beginning. In addition, the State Forests National Forest Holding was the primary stakeholder. They not only accepted the project but also provided expectations and guidance. The artificial fertilizer typically used was found to be inferior to the enhanced soil, and the overall cost saving for the project was approximately 100,000 EURO per year.

PROJECT DETAILS

The new land reclamation method is based on the process of a closed matter circuit and energy flow within an ecosystem. The mining and restoration activities occur in five steps:

1. Deforestation: The work commences with felling of trees and removal of timber. The land is cleared and chips obtained by crushing branches, roots, and stumps to be used as valuable biomass, typically comprising forest soil.
2. Stripping Overlayers: The layer of humus is selectively stripped from the thin layer of litter and chips. This mixture is stored in prisms, where the process of decomposition of organic matter takes place. Layers of soil rich in mineral compounds are then stripped and the overlay is removed.
3. Backfilling the Pit: The bottom of the pit is then filled with sand, spread evenly and compacted. Once the subgrade is ready, the pit is filled with the overlay from temporary storage sites, followed by the selectively stripped soil layers. Efficient restoration of the soil profile means that the roots of young trees can develop properly.
4. Humus Application: The layer of the overlay is then covered with a layer of humus with chips. During the storage in prisms, the chips undergo partial decomposition, enriching humus with organic nutrients that are essential for the forest soil microorganisms. The prepared soil thus offers optimum conditions for forest replanting and growing.
5. Reforestation: Container-grown seedlings from proven nurseries are planted and tended by qualified forest labour, under strict surveillance of professional foresters.

The Restoration of the Sępólno Gravel Pit has included the restoration of 100 hectares to date. Success was measured by growth of the trees themselves, and the dollar savings compared to the planting of lupines in artificial fertilizer. At a broader level, this project led to the development of a superior technique of reforestation. The technique was disseminated through several trainings of subcontractors and quarry workers, and through the work of the WULS.

Young trees growing in the area are prone to pest attack, so piles of dead wood have been located there in order to limit the number of the pests. These in turn provide refuge to local useful species of lizards, and are a natural factor of environmental resistance.

No additional funds were required to complete this study. The project was funded as part of LafargeHolcim's typical restoration plan, which requires site restoration prior to closure.

LESSONS LEARNED

Key lessons learned included:

- The communication between scientists and business was the most notable challenge. Specific terms and vocabulary had to be redefined and unified to obtain a good understanding.
- Involving State Forest executives on national level initially would have reduced delays in implementation.
- The new method proved to have no cost difference from the standard land restoration method but did reduce the land turnover time, and therefore long-term costs.
- Building a good restoration portfolio makes LafargeHolcim a reliable partner for former, current, and prospective stakeholders.

FUTURE IMPLEMENTATION AND NEXT STEPS

Several trainings on the reforestation technique were conducted. In addition, LafargeHolcim and the Faculty of Forestry at WULS-SGGW hosted a meeting with the Polish forest administration and local government representatives to discuss improvement and dissemination of the rehabilitation method developed in this project, as well as protection and the enhancement of biodiversity on mined land. The meeting resulted in a proposal for further research and monitoring, and the preparation of a land rehabilitation guide for subcontractors and quarry workers, along with trainings on effective topsoil stripping.

This is all in addition to continued studying of the effectiveness of the rehabilitation technique through WULS-SGGW and disseminating the knowledge to other foresters for future use. As a result of the project, WULS has planned the following additional actions to improve forestry activities:

- Testing variants of soil preparation and enriching it with organic matter, hydrogels and mineral compounds.
- Testing planting with covered and bare root systems in the mycorhizzal and non-micorhizzal variants.
- Testing various seasons for initiating restoration (autumn, spring), and the method of implementing restoration based on seeding.
- Evaluating the quality of the rehabilitated soil.

The analyses will include physio-chemical parameters as well as faunistic and phytopathological parameters. Soil parameters will be compared before the establishment of aggregate quarries and after the rehabilitation is complete.

Motivated by the results of this pilot study, LafargeHolcim plans to continue to make industrial areas as natural as possible, by taking steps such as building raptor perches, nest boxes and artificial shelters for bats.

REFERENCES

- LafargeHolcim and UEPG. 2013. *Synergy Results of the Innovative Restoration Method and the Biodiversity Approach at the Sępólno Gravel Pit*. 2013 UEPG Sustainable Development Awards.

ABOUT THE WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT (WBCSD)

The World Business Council for Sustainable Development (WBCSD), a CEO-led organization of some 200 forward-thinking global companies, is committed to galvanizing the global business community to create a sustainable future for business, society and the environment. Together with its members, the council applies its respected thought leadership and effective advocacy to generate constructive solutions and take shared action. Leveraging its strong relationships with stakeholders as the leading advocate for business, the council helps drive debate and policy change in favor of sustainable development solutions.

The WBCSD provides a forum for its member companies - who represent all business sectors, all continents and a combined revenue of more than $8.5 trillion, 19 million employees - to share best practices on sustainable development issues and to develop innovative tools that change the status quo. The council also benefits from a network of 70 national and regional business councils and partner organizations, a majority of which are based in developing countries.

http://www.wbcsd.org/home.aspx

VAT No.: CHE-108.244.629 TVA

Follow us on ***Twitter*** and ***LinkedIn***

Maison de la Paix, Chemin Eugène-Rigot 2 - CP 246,
1211 Geneva 21, Switzerland
Tel: +41 (0)22 839 31 00, info@wbcsd.org

1500 K Street NW, Suite 850, Washington, DC
20005, US
Tel: +1 202 383 9505, washington@wbcsd.org