

CONFIDENTIAL



*" Geopolymer is a cost-effective, environmentally friendly,
locally sourced alternative to Ordinary Portland Cement. "*

Geopolymer Concrete for Pre-Cast Products

Geopolymer Advantage

PolyRAP Systems LTD is an engineering solutions based research firm that has been working with the University of British Columbia on the development of sustainable building materials and environmentally sustainable solutions to cement.

We utilize industrial waste stream materials in the manufacture of a PolyRAP/ UBC patented geopolymer "Econcrete" (a non cement concrete) that is as strong or stronger than Portland Cement at a competitive price point. The process saves approximately 80% of the CO2 produced compared with the production of Portland cement.

Comparable Economics

Econcrete is price comparable to existing pre-cast.

Green Design

Econcrete products use substantial volumes of recycled materials including pulverized glass, fly ash and certain tailings.

Construction Speed

PolyRAP pre-cast products use existing pre-cast molds for speedy construction under dry curing.

Curing Time

Econcrete products gain substantial strength in the first day of binding. It is possible to achieve full strength in under 72 hours.



Geopolymer Commercial Products

- Utility boxes
- Transformer boxes
- Sewer pipe
- Road and parking lot curbs
- Embankments and retaining walls
- Structural panels and wall systems
- Railway sleepers
- Custom precast built to specification

Licensing Partners Benefits

Our material and processing costs are on par with cement based concretes. We are now ready to optimize our design mixes and are actively seeking a strategic partner to move to commercialization. We are also involved with research endeavors that are based on structural rehabilitation and retrofitting of concrete columns with FRP composites, polymer concrete, and nano materials as sustainable construction materials for bridge retrofitting and seismic upgrades.

Manufacturing Optimization

To ensure the production of geopolymer products meets and surpasses strength requirements, PolyRAP provides technicians to assist partners in setting up and maintaining operations.

Readily Sourced Materials

PolyRAP ensures our partners are equipped with all the primary based materials for manufacturing geopolymer products.

Concrete Alternative

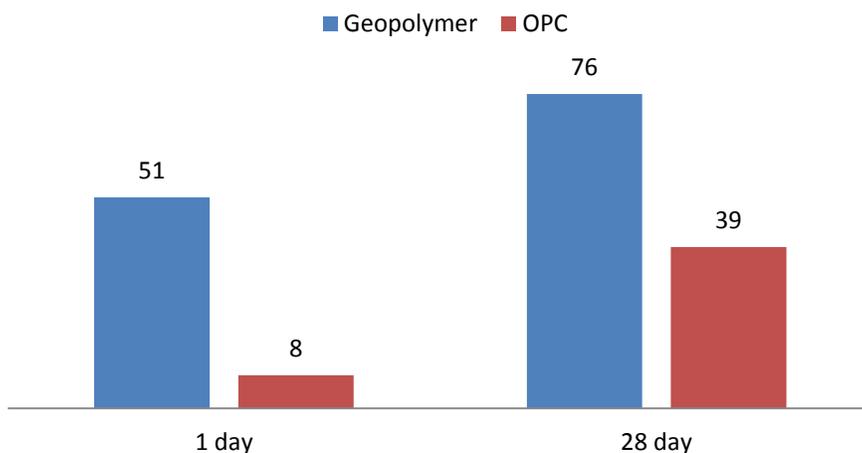
Over reliance on a single source causes product pricing to fluctuate based on market conditions. PolyRAP EConcrete comes from secured sources of base materials.

Environmentally Friendly Product

Many pre-cast manufacturers are actively seeking a environmental option at a economically sensible cost.



Reported MPA

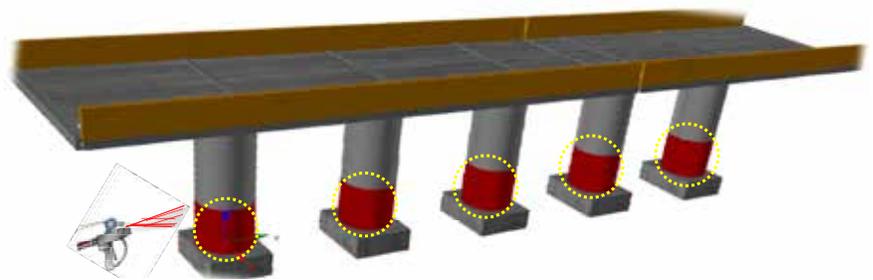


FRP Spray for Column Reinforcement

The FRP Spray Advantage

PolyRAP's patented *FRP Spray* adheres to timber, steel, or concrete structures. It is used to repair, retrofit, and strengthen structures such as bridges, overpasses, and buildings. FRP Spray was designed to increase shear and tensile strength in order to carry out emergency repairs after an earthquake or to strengthen structures prior to a seismic event with an easy to apply FRP spray gun.

The structure would first be inspected and assessed by our licenced engineers using a variety of investigative instruments and techniques. Recommendations are made to the contractor on repair requirements and the product is then sprayed on based on thickness measurements determined by the engineer.

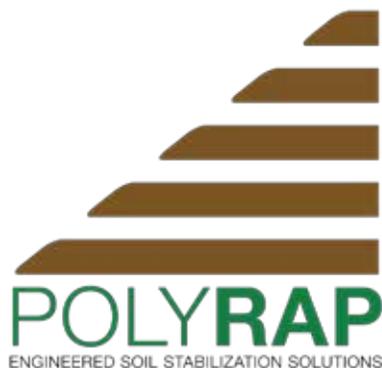


Installation Procedure

1. **Base arrangement** - Surface of concrete is polished by a disc-sander and cleaned by air.
2. **Primer resin coating** - Primer resin is applied to the surface in order to make a highly adhesive contact between the concrete and the resin.
3. **Putty arrangement** - Dented areas and steps on concrete surface are filled with putty. After curing, the surface is sanded.
4. **Resin coat** - In order to make fibers more adhesive, resin is coated first by spray gun.
5. **Spraying** - Resin and short fiber are sprayed at the same time using a specially designed chop gun.
6. **Impregnation** - Entrapped air is rolled out.

Economical and Efficient

PolyRAP's FRP Spray technology can quickly be applied to crumbling infrastructure for seismic and lifespan upgrading.



Market Potential

Geopolymer Concrete

The US concrete market is roughly \$250 billion. As the price per ton of Portland cement continues to rise annually, industry will begin actively seeking alternatives. The solution is PolyRAP's geopolymer E-concrete with 80% less CO₂ and over 60% recycled and waste content.

The gross margin for the Cement and Concrete Product Manufacturing industry group was 41.6% in 2010. There exists an opportunity to expand into this market with PolyRAP's E-concrete as a cost effective alternative to ordinary portland cement and high strength cements.

FRP Spray

The United States alone has over 685,000 bridges past their service life. British Columbia is currently overhauling seismic requirements for schools, hospitals and infrastructure. PolyRAP's FRP Spray is a solution to seismic and lifespan upgrading.

Market Prospects

- Municipal, Provincial and Federal Governments
- Local community development
- Hydro projects
- Manufacturing for own use: housing, roads, recreational, healthcare and educational facilities.
- Lumber yards and garden centres
- Developers looking for "LEED"
- Railway companies
- Agricultural industry
- Construction and engineering companies

Moving Forward

Most of the cost of precast concrete products is in the actual materials and supplies utilized. (96%). With our business model we can significantly reduce or control those costs by charging tipping fees for mine waste and recycled waste glass powder. Cement based concrete has gone up in price steadily over the past ten years.

LEED points will play a larger role in construction material procurement as we move towards a sustainable industry. Post industrial waste material is becoming more important as a cement replacement and LEED currently allows only half the points for these waste materials. Our final design mixes will utilize approximately 70% recycled content making them some of the most sustainable construction products on the market.





Management Team

Eric Marciniak, President

For the past four years Mr. Marciniak has been leading the development and commercialization of a new generation of sustainable concrete. The idea for Econcrete was developed out of the need to improve on the performance of ECO-Safe water dispersed polymers used to stabilize soils in cold and wet environments. Prior to his work with Polymers and concrete materials, Eric owned and operated Maret Investments, a registered home builder in Winnipeg. Besides residential construction and land development, Maret Investments also contracted as a deconstruction (salvage and demolition) operation. Eric, a lifelong entrepreneur saw the opportunity in the dismantling, processing and reselling of recycled building materials. Econcrete will take recycling to a new level with truly sustainable infrastructure materials for the present.

Joe Gardner, CMA, CFO

Mr. Gardner is an experienced Certified Management Account. He is currently the principal for a full service commodity tax firm specializing in performing tax audits of large North American companies and organizations. with additional experience in First Nation commodity tax consulting firm. Furthermore offering commodity tax consulting and audit training provided to accounting staff and Chief and Council at First Nation organizations and Indian Bands in Canada.

Rick Pogue, Corporate Strategy

Mr. Pogue attended Western University in London Ontario majoring in Business. He has over twenty-five years experience in the investment industry, and has been working with Raymond James Ltd. during the most recent eight years. Mr. Pogue has been involved with many start-up companies throughout his career taking them from concept to publicly traded. Rick is also involved with the security training industry.

Brendan Pogue, MBA, Business Development

Brendan studied his MBA in Europe at a top-rated French University where he placed among the top of his class. Previous work experience has been in the start-up business, where Brendan has successfully been involved in achieving over \$300,000 in research grants, writing patents applications, developing new technologies and commercialization strategies. Brendan acted as Development Project Manager for the emPowerbook, a solar powered eReader, and co-founded PolyRAP and TeleoTravel in 2011 and 2012.



Technical Team

Dr. Karuna Bhattacharjee, B.Sc, M.Sc, Ph.D

Director of Engineering

Dr. Bhattacharjee has 32 years of expertise in optimisation. With Proven achievements in energy reduction by the use of alternate fuels and materials and optimising process parameters, Dr. Bhattacharjee has extensive R&D experience with blended cements and special concretes. His Ph.D thesis specialized on Energy Conservation and Quality Improvement in the manufacture of various types of cements. He is tech savvy and has a special aptitude to run processes by expert systems. Karuna has presented various papers in International seminars and published scientific papers in reputed international cement and concrete journals and is well versed with industrial safety and environmental controls as applicable to cement industry.

Dr. Shahria Alam, B.Sc, M.Sc, Ph.D

Chief Investigator

For the past six years, Dr. Shahria Alam has been extensively involved in research related to smart materials and their structural applications, seismic rehabilitation of deteriorated structures, and performance based design of reinforced concrete, prestressed concrete, and masonry structures. He is a winner of many awards and scholarships, and his research contribution has been recognized by various professional bodies and institutions. Prior to join at UBC-Okanagan, Dr. Alam has worked in several industrial projects while working as a structural engineer for Halcrow Yolles (Toronto) and JNE Consulting Ltd. (Hamilton, ON).

Anant Parghi, B.Sc, M.Sc

R&D Engineer

Anant Parghi is a Ph.D candidate at the University of British Columbia Engineering department. His extensive experience with concrete, recycled additives, and structural construction and repair makes him an ideal team member for developing the future of PolyRAP's geopolymer concrete. Mr. Parghi has contributed significantly to PolyRAP's proprietary development.



Collaborative Research



Our close working relationship with the *University of British Columbia* brings world leading researchers and facilities to industry forefront. Over three years of collaborative research, design and laboratory testing gives us the confidence to move forward with geopolymerization.

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PolyRAP Mining Partnership

PolyRAP Systems Ltd has developed a new patented technology that allows us to design and build infrastructure in rural and northern areas by utilizing mine wastes materials such as tailings and overburden.

Using our proprietary mix design and precast process it is now possible to manufacture econcrete building products on mine sites or adjacent communities. Pre-fab housing and buildings, industrial structures, tailings dams, bridge supports, retaining blocks, pipe, utility boxes, and custom products.

Complete mobile precast plant can be trailered to remote sites set up and utilized to manufacture all required components and then be moved to next location.



Aside from some base proprietary chemicals and fibre, most ingredients would be recycled and prepared as feedstock for high strength concrete from on-site waste storage areas.

Our system minimizes import materials and maximizes the use of in-situ materials thereby saving transportation and storage costs.

Our system can significantly reduce CO2 emissions as well as potentially capture and store CO2.





Corporate Social Responsibility

Using more reclaimed and recycled material in construction is a powerful way of making a contribution to sustainable development by diverting materials from landfill and limiting the depletion of finite resources.

Contractors and designers can make major improvements in materials efficiency relatively easily, by minimizing waste generation in construction, maximizing the proportion that is recycled, reusing materials and selecting construction products with a higher recycled content. Construction clients, developers, public bodies and planning authorities are increasingly setting requirements for reused and recycled content on their projects.

Sustainability Benefits

- Demonstrate performance against corporate responsibility and sustainability policies without incurring a cost premium.
- Reduce materials cost. For example where locally reprocessed demolition materials are cheaper than virgin aggregate.



Materials

- Meet the requirements of planning authorities
- Provide a competitive edge through differentiation
- Show commitment to recycling and good practice in the public sector
- Make reclamation and recycling more economic
- Satisfy the values held by employees
- Complement other aspects of sustainable design
- Respond to and pre-empt public policy initiatives
- Available in high volumes
- Cost competitive with and subject to the same testing arrangements as, equivalent products containing less recycled material.

Higher Recycled Content

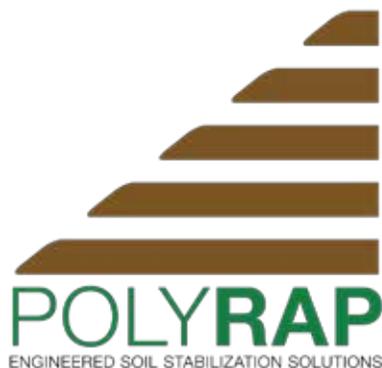
Increasing the proportion of the materials used in a project that come from a recycled source is a relatively simple, practical and cost-neutral way of showing a measurable contribution to more sustainable construction.

Further Benefits

- **Enhanced reputation** – being able to quantify performance against corporate responsibility and sustainability policies helps gain the approval of external stakeholders and employees.
- **Driving down the cost of waste management** – in the longer term, the increased use of recycled material will enhance its value and thereby make it more cost effective to recycle (as is the case with most metals).
- **Meeting planning requirements** – planning authorities are increasingly setting conditions for environmental performance as part of the development process.
- **Competitive differentiation** – both developers and contractors can demonstrate how they will support a prospective client's sustainability objectives.
- **Leadership** – providing a mechanism for public bodies to show their commitment to recycling and sustainable procurement.
- **Reducing materials costs** – reusing materials and products or the use of locally sourced construction and demolition waste is often cheaper than using virgin materials.
- **Responding to and preempting public policy** – those organizations that respond to the thrust in public policy for sustainable construction will be in an advantageous position in comparison with those that wait until they are compelled to act by legislation.

Using more recycled material in construction is a particularly attractive option because it is easy to do and need not impact the design, specification or cost of a project. Simply by selecting commonly available products that have above average recycled content, it is possible to be significantly more efficient in the use of natural resources without compromising cost, quality or construction programs.





Helping Create a Circular Economy

Linear “Take, Make, Dispose” industrial processes and the lifestyles that feed on them deplete finite reserves to create products that end up in landfills.

Many industrial processes rely on the consumption of finite resources. Furthermore manufactured waste may have an environmental impact and can affect human health. Within this context, upcycling describes the use of available and future technologies to reduce waste and resource consumption by creating a product with a higher value from waste or byproduct streams.

Using more reclaimed and recycled material in construction is a powerful way of making a contribution to sustainable development by diverting materials from landfill and limiting the depletion of finite resources. Contractors and designers can make major improvements in materials efficiency relatively easily, by minimizing waste generation in construction, maximizing the proportion that is recycled, reusing materials and selecting construction products with a higher recycled content.

New Sources of Raw Material

- New products
- New business opportunities
- Sustainable renewable resources
- Availability and price stability
- Sourced supply security

Source of “Green” Materials

- Reduced carbon footprint
- Recyclable
- Novel functionality
- Reduction in weight

PolyRAP Econcrete Market Drivers

- “Green” is the true value proposition for this technology
- Partnering with proactive municipalities and companies who have publicly stated their intent to “Go GREEN”
- Cost versus current materials
- Increased use of post-consumer waste (glass)
- Eliminate environmentally sensitive materials and processes
- Up to 90% CO2 reduction over OPC (Ordinary Portland Cement)

Forward-Looking Statements

This document contains “forward-looking statements” – that is, statements related to future, not past, events. In this context, forward-looking statements often address our expected future business and financial performance and financial condition, and often contain words such as “expect,” “anticipate,” “intend,” “plan,” “believe,” “seek,” “see,” “will,” “would,” or “target.” Forward-looking statements by their nature address matters that are, to different degrees, uncertain, such as statements about expected projects; income; economic impact; etc.



POLYRAP
ENGINEERED CONCRETE SOLUTIONS

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