

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

**Step Into Sustainability**

Upcycling Rejected Nitrile Rubber Gloves into Comfortable,
Durable and Eco Friendly School Shoes

Geomax Rubber

-  Selangor, Malaysia
-  Rubber, Footwear
-  geomaxrubber.com
-  Analysis period: 2018-2026

Repurposing Rejected Nitrile Rubber Gloves into Sustainable Footwear**Business Spotlight**

Geomax Rubber Innovative Products (hereafter referred to as Geomax Rubber) has pioneered a patented green technology that transforms rejected nitrile rubber gloves, sourced from gloves manufacturers for medical and other industries, into eco-friendly rubber compounds for sustainable footwear outsoles and shoes. With this innovation, the company has developed and manufactures flip-flops and safety shoes with anti-slip features, creating a safer and circular product that is accessible for everyday use. Marketed under the Solewell brand, Geomax offers a unique product line of sandals and flip flops.

By diverting discarded nitrile gloves from landfills or incineration, Geomax Rubber not only reduces waste but also enhances and upgrades the rubber properties to deliver higher-quality products. The rubber qualities of the rejected gloves remain intact, as well as its strength, flexibility and durability. Solewell is the world's first eco sandal made with rejected nitrile rubber gloves and with an anti-slip sole design. These eco-soles demonstrate that waste can be reintroduced into the value chain, creating durable, sustainable footwear with superior features that are an attractive alternative to traditional rubber soles.

 Keywords

Nitrile gloves, Anti-slip footwear, Rubber compounds, Repurposing, Industrial symbiosis

 Innovation

Product/service design, Manufacturing, End of life management, Resource circularity, Resource efficiency



Context and baseline

The COVID-19 pandemic triggered an unprecedented surge in global demand for nitrile – also known as synthetic rubber – gloves, creating both an economic opportunity and an urgent environmental challenge. Market projections indicate that until 2027, demand for nitrile gloves will continue to rise at an annual growth rate of 10.6%–11.2%.¹ Yet, despite this growth, stringent quality control standards for the medical application of nitrile gloves mean that up to 15% of manufactured nitrile gloves are rejected, adding to a mounting waste burden.² On a worldwide scale, rejected (pre-use) and discarded (post-use) gloves are sent either to incineration or landfill disposal. Malaysia, as the world's leading producer supplying 75% of nitrile gloves used internationally, faces the staggering reality of approximately 100 tonnes of glove waste generated monthly.³ And whether disposed in landfill or incinerated, nitrile glove waste poses significant risks to both the environment and public health.

Geomax Rubber has emerged as a pioneering company tackling this challenge and repurposing rejected, unused nitrile gloves into a resource for ecofriendly rubber compounds. Under the firm's Solewell brand, Geomax transforms rejected nitrile gloves into eco-friendly footwear, a ground-breaking repurposing process that merges engineering functionality with environmental responsibility.

Geomax was founded by Mr Steven Ng, a seasoned professional with over 20 years in the rubber industry and the backing of his family's shoe-sole business. Geomax Rubber began experimenting in 2018 with repurposing glove waste into sustainable footwear soles. The result is a patented process that converts rejected nitrile gloves into high-performance circular-rubber compounds that are used for manufacturing soles, safety shoes, sandals, flip flops, and boots. The company's guiding ethos, 'Stepping forward to a better environment', expresses that waste has been reimaged as a resource, thereby reducing the burden on landfill and simultaneously creating value, while making circular products accessible in everyday life.

Innovation

Geomax Rubber created the world's first 'circular' sandal made from rejected nitrile gloves, a milestone in sustainable footwear innovation. Clean, rejected gloves are collected directly from glove factories, and the company repurposes them to serve as input material for footwear production. Glove factories save on disposal costs, while Geomax Rubber gains access to a steady supply of quality feedstock, creating a true win-win solution. This is a practical example of industrial symbiosis in which the waste from glove making industry is turned into an input for the shoe sole making industry.

Through its patented green technology, Geomax Rubber converts rejected gloves into advanced circular-rubber compounds. These compounds are molded into soles for sandals, school shoes, men's leather shoes, and safety footwear, and the rubber retains its strength, flexibility, and durability. Design innovations have created anti-slip features that have been demonstrated on slopes coated with oil and water. Putting material and design innovations together ensures superior safety and performance that is used for a high-quality, affordable eco-footwear collection of sandals, school shoes, men's leather shoes and safety shoes. All the company's products combine durability, comfort, and resource efficiency.

The Geomax's commitment to innovation has positioned the company as a pioneer in new rubber material development, enhancing safety footwear performance while reducing environmental impact. Their advanced circular material, manufactured with repurposed nitrile glove waste, was awarded the SIRIM Eco Label⁴ and the MyHijau mark⁵, demonstrating that Geomax Rubber's innovation delivers worker safety and reduced carbon footprint simultaneously. The MyHijau label confirms that the eco-safety shoes are made with sustainable materials, ensuring environmental responsibility alongside durability and performance. The Green Outsole, created with a patented circular rubber technology, offers anti-slip and non-marking features, delivering abrasion resistance, lightweight comfort, and long-lasting durability. Anti-slip soles provide maximum protection against workplace and other accidents, showing how circular products can also enhance safety performance.

1 Patrawoot S., Tran T., Arunchaiya M., Somsongkul V., Chisti Y and Hansupalak N. (2021). Environmental impacts of examination gloves made of natural rubber and nitrile rubber, identified by life-cycle assessment. *SPE Polym.* 2, 179–190. 10.1002/pls2.10036

2 Hayeemasae N., Masa A., Ahmad H.S., Shuib R.K., Ismail H and Surya I (2022). Sustainable Recycling of Waste from Nitrile Gloves: Prolonging the Life Span by Designing Proper Curing Systems. *Polymers* 14(22):4896. <https://doi.org/10.3390/polym1422489>

3 <https://www.satra.com/bulletin/article.php?id=2955>

4 <https://www.sirim-qas.com.my/service/eco-labelling-scheme/>

5 <https://www.myhijau.my/>

Beyond footwear, Geomax Rubber is exploring the repurposing of sawdust into wood composites and repurposing used denims into eco-tiles, expanding their circular economy expertise to other materials.

Circular Economy impact

The circular-rubber soles of Geomax Rubber contribute to a circular economy through repurposing and the circular use of rubber, demonstrating the resource circularity strategy. The improved quality and durability of the circular rubber extend the useful life of the shoe soles, contributing to resource efficiency in the product-use phase.

By taking rejected nitrile gloves provided by the glove industry for repurposing into shoe soles, Geomax is turning a costly disposal challenge into a valuable resource stream. Thus, the circular economy is directly supported via recovery and reintegration of previously-discarded waste into productive use, keeping the nitrile rubber in use in shoe soles while minimising environmental harm. Around 8 tonnes of nitrile gloves are repurposed monthly; 18 pairs of rejected gloves produce one pair of eco soles; and 65 pairs of rejected gloves produce one pair of eco-safety shoes. The recovered nitrile rubber contains up to 99% recycled material contents, and this replaces virgin synthetic rubber in the production of soles, thus reducing reliance on virgin rubber resources. And this process avoids rejected nitrile gloves being disposed in landfill or incineration, and their resultant environmental impacts.

Geomax Rubber's eco-material outperforms virgin rubber in abrasion, oil, and heat resistance, as verified by SIRIM testing, further extending the useful lifetime of the sole and thus contributing to resource efficiency in the use phase. And Geomax has committed to the Sustainable Development Goals (SDG) 8, 9, 12, 13 and 17 which emphasise resource circularity and resource efficiency.



Business and market impact

- **Cost savings and resource efficiency:** By collecting rejected nitrile gloves directly from glove-factories, Geomax Rubber reduces disposal costs for glove manufacturers while securing a steady supply of raw materials for footwear production. This dual benefit strengthens industry partnerships and creates measurable savings between the glove and footwear value chains.
- **Market differentiation:** Geomax Rubber's eco-safety shoes stand out in a crowded market for personal protective equipment (PPE) by combining sustainability with superior safety performance. Customers value the anti-slip technology, with some even crediting it for preventing workplace accidents. This unique positioning enhances brand recognition and customer loyalty.
- **Alignment with environment, social and governance (ESG) goals:** Geomax Rubber directly supports corporate ESG commitments by reducing nitrile glove waste, lowering carbon footprint, and promoting sustainable and responsible production and consumption, in alignment with the Sustainable Development Goals (particularly SDG 8, 9, 13 and 17). Certification by the SIRIM Eco Label and MyHijau mark confirms conformance with international sustainability standards.
- **Strengthening ESG Compliance:** Geomax Rubber products help industries as diverse as construction, mining, healthcare, and hospitality ensure worker safety, reinforcing the company's appeal with multinational corporations and government procurement programmes.
- **Market reach and product diversification:** Eco-safety shoes are suitable across diverse sectors including automotive, aviation, agriculture, marine, chemicals, oil and gas, and logistics. Reaching beyond footwear, Geomax Rubber has expanded into eco-cup coasters, floor mats, bags, and rubber pluckers.
- **Business growth and financial performance:** Operating at 90% capacity, Geomax Rubber is generating annual sales of approximately MYR 2.4 million (approximately EUR 425,000). Expansion plans include securing tailored financing to build a new factory and scale production for broader market penetration.
- **Recognition and awards:** Geomax Rubber's leadership in sustainable innovation has been widely recognised:
 - Tatler Asia's Gen. T Leaders of Tomorrow 2025
 - Innovator of the Year – Top In Tech Innovation Awards (2024)

- Gold Award for Invention, Eco Footwear – SIRIM Invention, Innovation & Technology Expo (2024)
- ESG Positive Impact Awards 2022 – Outstanding ESG Initiatives (SME to Mid-tier)
- Gold Winner in the category Responsible Consumption & Production (SME to Mid-tier) (2022)
- Best Agricommodity Startup of the Year (Rubber) – Ministry of Plantation, Industries & Commodities (2022)
- Featured in *The Edge Malaysia* and *Vulcan Post*



Stakeholders

The rising demand for Solewell branded eco-footwear reflects strong stakeholder support, with customers returning for more products and actively encouraging the company's mission to expand. The company is built on 6 Ps: Planet, People, Prosperity, Purpose, Partnership, and Performance. These values guide every decision, ensuring that growth aligns with sustainability and stakeholder expectations. With a dedicated team of 10 members, Geomax Rubber takes pride in rigorous research and testing standards that underpin the credibility of the Solewell brand. The addition of two co-founders in 2022 strengthened leadership capacity, while ongoing recruitment of professional management aims to scale operations responsibly.

The company contributes to local employment and raises awareness of sustainability through outreach events, training sessions, and demonstrations of circular economy practices. Not only is the rubber industry boosted, but other businesses are inspired to adopt planet-friendly production practices.

Partnerships are Geomax Rubber's core strength. By leveraging resources and networks, the company has co-developed new eco-products such as eco-diary covers and eco-tote bags, and partnered with the FOSSER brand for safety footwear. Networking at business and innovation events further promotes products and builds market visibility. Geomax Rubber is transitioning from B2B to B2C⁶, and working towards stronger brand positioning for long-term growth. Plans include expanding into school shoe production, addressing Malaysia's reliance on imports, and scaling manufacturing capacity to meet rising demand.

Implementation

The path to Solewell's eco-footwear innovation was a two-year journey that began even before the pandemic. Early scepticism posed a major hurdle as many doubted the feasibility of repurposing rejected nitrile gloves into viable rubber products. Geomax Rubber, determined to prove this material innovation, set an ambitious target of 60% rejected gloves and 40% rubber in its products. Through continuous research and innovation, the team has now achieved a 99% recycled material content, a breakthrough that has set new industry standards.

Despite limited funding, machinery, and expertise at the outset, the team remained focused on their goal. In 2022, Geomax established their own factory, scaling production from a small unit to a larger facility. Starting with five tonnes of recycling capacity per month, the factory now processes eight tonnes per month, with plans to expand further. The company continues to innovate to ensure no rejected nitrile gloves end up as waste in landfills, thereby reinforcing their commitment to circular economy practices.

With vast amounts of nitrile glove waste available globally, Geomax currently uses less than 5% of monthly nitrile glove waste, leaving significant room for expansion. Plans include scaling operations with a larger factory, expanding into women's footwear, and developing more eco-products. Beyond nitrile gloves, Geomax Rubber is exploring ways to upcycle sawdust, textiles, and other unwanted materials into eco-friendly products, broadening the company's sustainability impact.

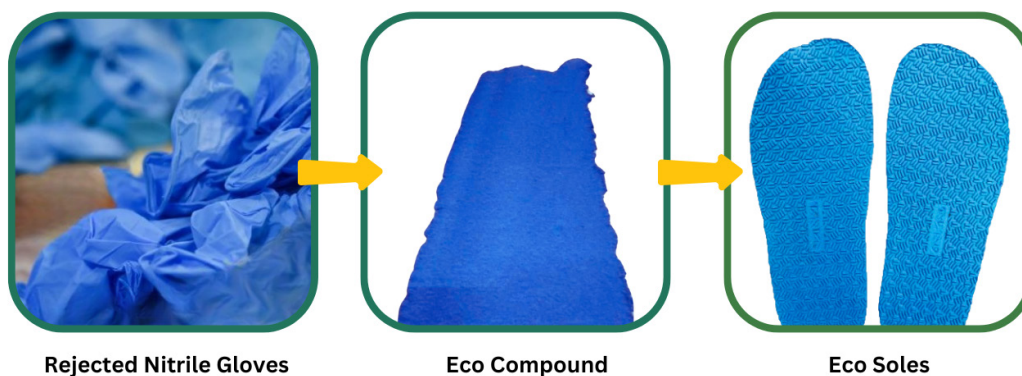
6 B2B means 'business to business; B2C, 'business to customer'.

Takeaways

Geomax Rubber demonstrates scalable circular innovation, and has positioned itself to lead in eco-footwear and beyond. By converting rejected nitrile gloves into eco-friendly compounds and finished products, the company has created a business built on a sustainability ethos, materials innovation, and circular economy principles. The firm's breakthroughs in eco-rubber compounds for safety footwear showcase superior performance compared to the use of virgin materials. They are working towards protection of their intellectual property to strengthen their competitive advantage. Geomax Rubber, through business events, startup forums, and training programmes, provides guidance to the rubber industry community, demonstrating

how circular economy practices deliver both environmental and business benefits.

Diverting up to some 100 tonnes annually of nitrile glove waste from landfills into consumer footwear proves that production waste can be kept out of disposal sites, reducing pollution and supporting a greener future. Geomax Rubber illustrates what it means to go beyond rubber, combining durability, performance, and environmental responsibility. While rooted in Malaysia, Geomax Rubber aims to expand internationally, positioning Solewell as a leading global brand in sustainable footwear innovation.



Funded by
the European Union

Acknowledgements

This business case study was prepared for the ASEAN Circular Economy Business Alliance (ACEBA) within the framework of the Technical Advisory project: Mobilising Business Action for Circular Economy in the ASEAN countries under the EU SWITCH-Asia Policy Support Component for the sole purpose of documenting and analysing business experiences with circular economy. ACEBA is an ASEAN-centric and business-led initiative that fosters business leadership and action on circular economy in Southeast Asia. ACEBA is an initiative of ARAIBA Sdn Bhd, a not-for-profit business organization that promotes responsible and inclusive business, in collaboration with national business membership organizations and with technical advisory of the EU SWITCH-Asia Policy Support Component.

The business case was produced by Sri Shalini Sathyanarayanan (circular economy expert) and reviewed by Rene Van Berkel and Thomas Thomas (regional experts and ACEBA co-convenors) on the basis of information provided and validated by Geomax Rubber Innovative Products Sdn Bhd, Malaysia.

Disclaimer

The content of this publication is the joint responsibility of Geomax Rubber Innovative Products Sdn Bhd, Malaysia and the expert team. This publication does not constitute an endorsement of Geomax Rubber Innovative Products Sdn Bhd, Malaysia by the European Union nor any of the partners of the SWITCH-Asia Policy Support Component, nor necessarily reflect their views.



www.aceba.co



info@aceba.co



www.switch-asia.eu



EU SWITCH-Asia Programme
[@EUSWITCHAsia](https://www.facebook.com/EUSWITCHAsia)



SWITCH-Asia
[@SWITCHAsia](https://twitter.com/SWITCHAsia)



SWITCH-Asia Official
[@switch-asia-official](https://www.linkedin.com/company/switch-asia-official)