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THE WORLD OF PETROLEUM AND BITUMEN

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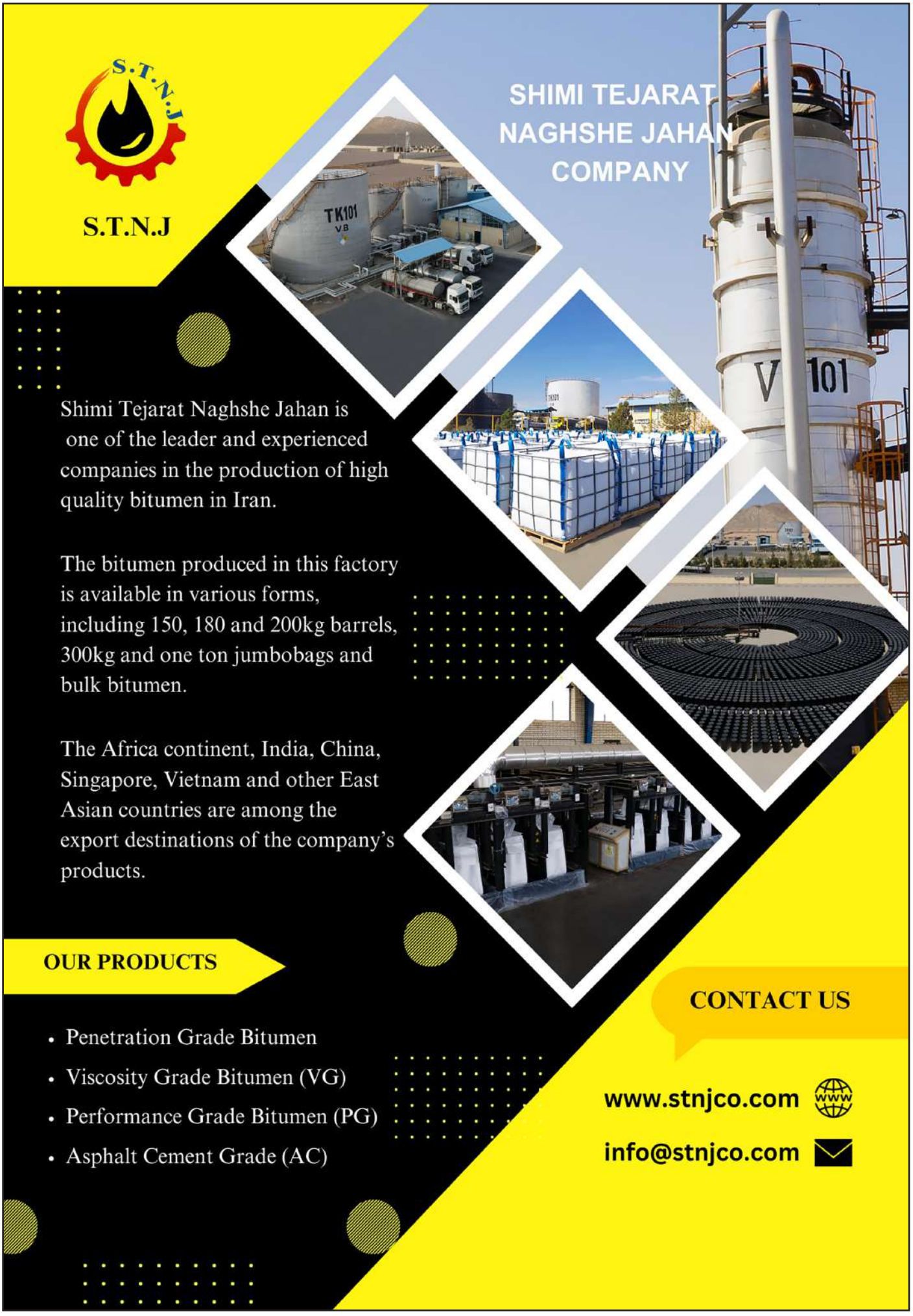
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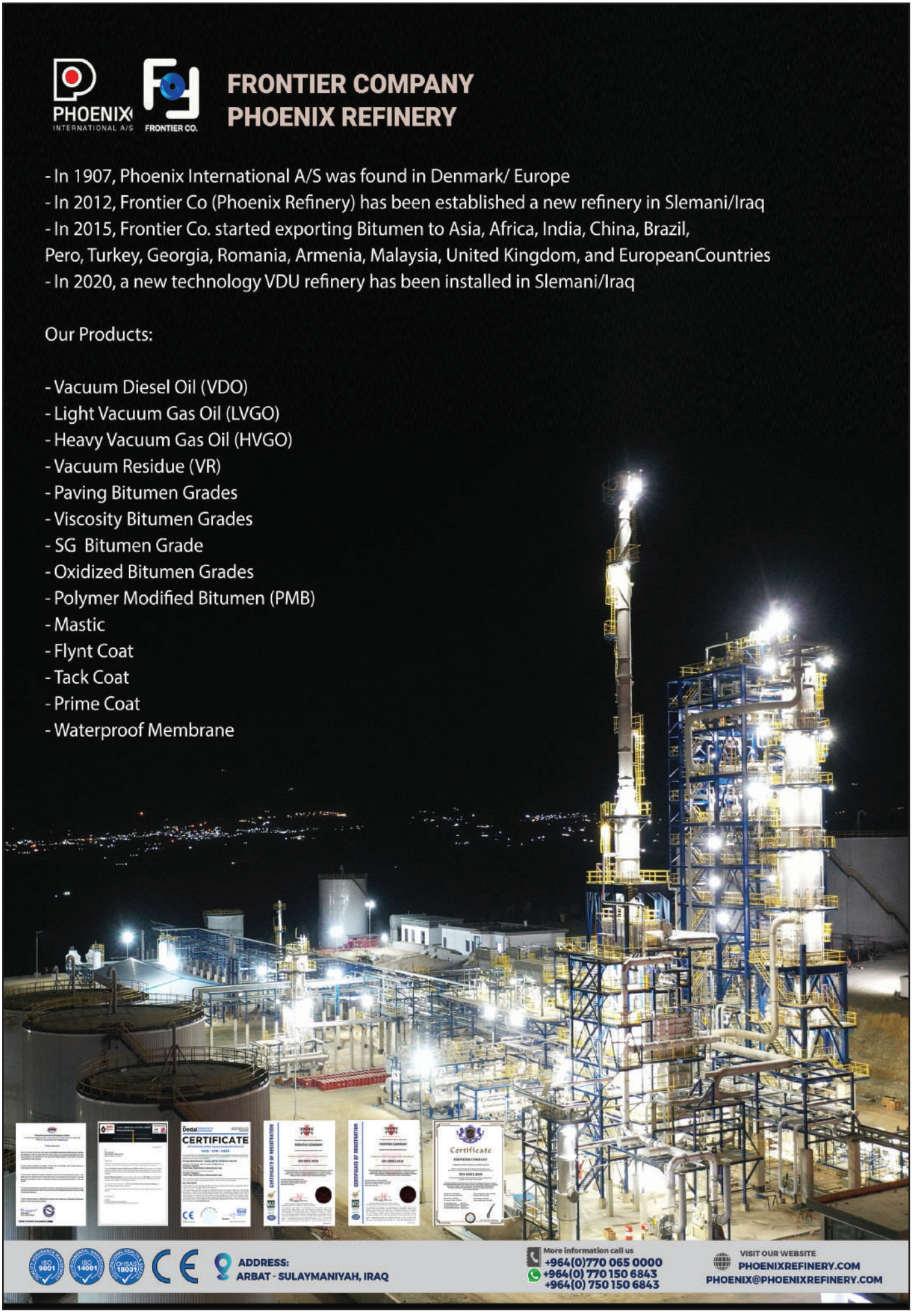
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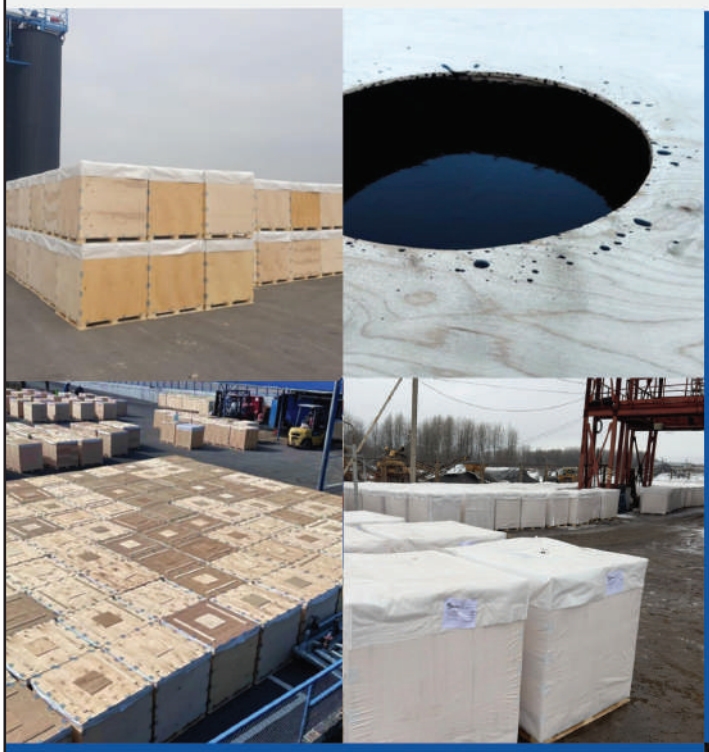

The dimensions of the container when assembled are 1060x1060x1095 mm. The capacity is up to 1040 kg of hot bitumen of various thicknesses. The heat resistance of the package is up to 200 degrees. The container is made only of glued material — FC plywood, glued in a checkerboard pattern. This eliminates the need to process and install the ISMP15 stamp during export. Storage is allowed in 4 tiers on a flat surface. The assembly is carried out using special keys in 3 minutes. When disassembled, the euro trolley holds 350 sets.

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With a decade of activity in the bitumen and petroleum derivatives industry in the field of printing and publishing specialized news and selected scientific articles from conferences, symposiums, research centers and universities, and introducing brands and companies producing petroleum and bitumen, the World of Petroleum and Bitumen Journal has been able to gain the trust of more than 6000 permanent audience in such a way that they would like to receive the print version of the journal every month.

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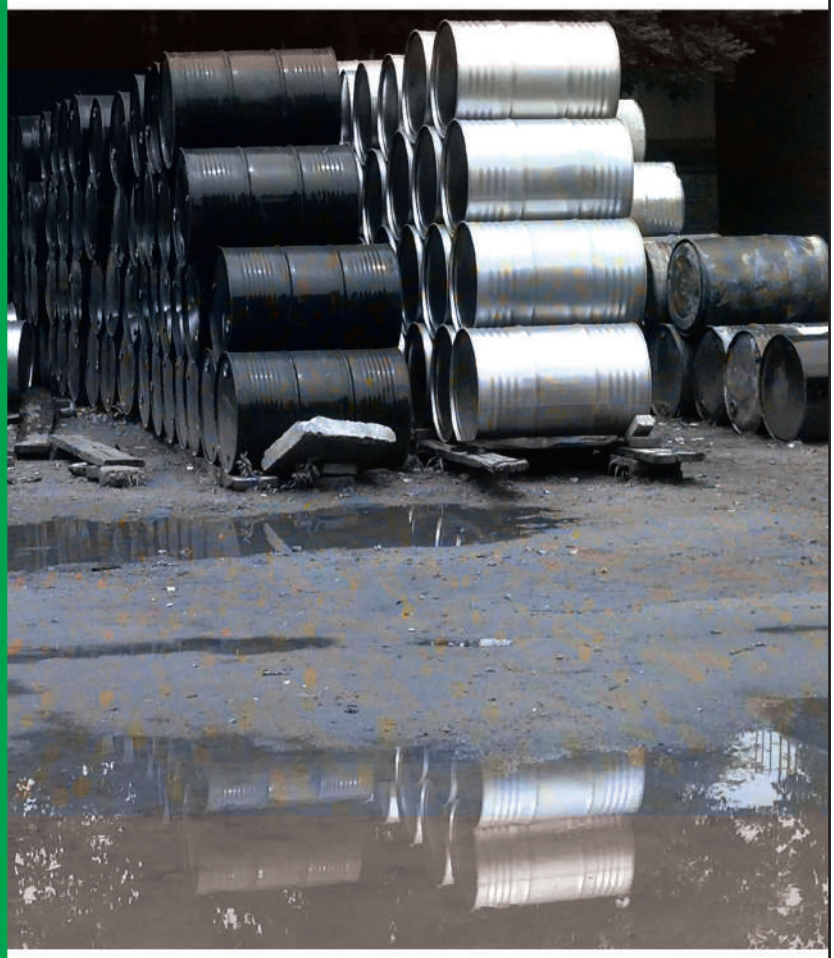

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"As Thailand continues to invest in infrastructure and modernize its transportation networks, the bitumen sector is poised for sustained growth."

Thailand's Expanding Role in the Southeast Asian Bitumen Market

Thailand has also expanded its role as an exporter

WPB: Thailand's bitumen industry has been experiencing rapid expansion, driven by the country's commitment to infrastructure development, increasing urbanization, and rising demand for durable road construction materials. The government's continued investment in expressways, highways, and urban transport networks has significantly influenced the consumption and trade of bitumen. As the country strengthens its position in the regional market, both domestic demand and international trade dynamics are shaping its role in Southeast Asia's bitumen sector.

One of the primary forces behind the increasing use of bitumen is Thailand's growing network of roads and highways. Large-scale construction projects, many of which are part of national development initiatives, require high-quality paving materials to support long-term durability and performance. The government has prioritized strategic projects such as the expansion of the Eastern Economic Corridor, a critical transportation and logistics hub. Additionally, transnational infrastructure programs aimed at enhancing connectivity with neighboring countries have fueled the need for road construction materials. Expanding cities like Bangkok and Chiang Mai further contribute to this rising demand, as they require well-maintained roads to accommodate growing populations and economic activity.

To improve the longevity of roads and highways, Thailand has been increasingly adopting polymer-modified bitumen, which offers enhanced resistance to extreme weather conditions and traffic loads. With its ability to withstand high temperatures and heavy use, this advanced bitumen type has become a preferred choice for critical infrastructure projects. In addition, the country is aligning with global sustainability trends by exploring bio-based and recycled bitumen solutions that reduce environmental impact while maintaining performance standards.

Bitumen trade in Thailand is also undergoing notable shifts. As one of Southeast Asia's largest bitumen importers, the country sources a significant portion of its supply from refining centers in Singapore and Malaysia, as well as key producers in the Middle East. In 2023, Thailand imported approximately 1.2 million tons of bitumen to meet local demand, a figure projected to rise to 1.5 million tons in 2024 as new construction projects drive additional consumption. While primarily dependent on imports, Thailand has also expanded its role as

an exporter, supplying neighboring countries such as Vietnam, Laos, Myanmar, and Cambodia. In 2023, outbound shipments reached around 400,000 tons, with an expected increase of 8-10% in 2024. This growing export activity highlights Thailand's emergence as a regional supplier, supported by its refining capacity and strategic trade position.

Efficient logistics and packaging are essential in Thailand's bitumen supply chain. Bulk transportation via tanker trucks and cargo ships remains the most common method for large-scale projects, ensuring timely delivery to major construction sites. Steel drums are frequently used for smaller orders, particularly for specialized applications. In export markets, jumbo bags with reinforced pallets offer a practical solution for controlled shipments. Thailand's trade infrastructure, including major ports such as Laem Chabang and Bangkok Port, plays a crucial role in handling bitumen imports and exports, ensuring smooth distribution across domestic and international markets.

The introduction of high-performance bitumen grades is another key development in Thailand's market. Engineers are increasingly utilizing polymer-modified bitumen for highways and urban roads, as it provides superior resistance to cracking and wear. High-performance bitumen is also becoming more common in critical applications such as airport runways and bridges, where durability is essential.

As Thailand continues to invest in infrastructure and modernize its transportation networks, the bitumen sector is poised for sustained growth.Government-backed projects, increasing exports, and the adoption of innovative and sustainable materials are shaping the country's role as a significant player in Southeast Asia's bitumen market. With a focus on long-term development and advanced construction technologies, Thailand is set to strengthen its position as both a major consumer and supplier of bitumen in the region.

THAILAND'S ASPHALT MARKET: GROWTH, TRENDS, AND FUTURE PROSPECTS

Market Size and Growth Projection

As of 2025,

Thailand's asphalt industry is valued at nearly $9 million, with an anticipated annual growth rate of 8.4% over the following six years. By 2031, the market is estimated to expand to around $12 million. The construction sector plays a crucial role in shaping the market's trajectory.

Market Overview

Thailand's asphalt industry is on an upward trend, largely due to the country's continuous infrastructure development and rapid urbanization. Government-led initiatives focusing on large-scale projects—including new roads, highway extensions, and the expansion of airports and seaports—have significantly boosted asphalt demand. As Thailand cements its position as a key transportation hub in Southeast Asia, the necessity for high-quality asphalt in both domestic and cross-border projects has surged. Additionally, the increasing shift toward sustainable construction—such as using recycled asphalt and environmentally friendly alternatives—further contributes to the market's expansion. Investments from both the public and private sectors, along with a growing emphasis on long-lasting and high-performance roads, are expected to drive future market growth.

Market Expansion and Key Influencing Factors

The asphalt market in Thailand is forecasted to maintain a steady growth rate of 8.4% from 2025 to 2031. This growth is primarily attributed to substantial infrastructure investments, particularly in transportation and urban projects. Key drivers include:

• Government Infrastructure Initiatives: The ongoing expansion of Thailand's road networks, highways, and urban areas has created a continuous demand for asphalt. Major development projects such as the Eastern Economic Corridor (EEC) have played a pivotal role in boosting the need for high-quality paving materials.

• Thailand's Role in Regional Trade: The country's status as a strategic transportation hub in Southeast Asia has increased the requirement for durable road surfaces, ensuring efficient trade and connectivity.

• Technological Innovations: Advances in asphalt production—such as the integration of polymer-modified asphalt and the rising adoption of recycled materials—are improving road quality while reducing environmental impact.

• Challenges in the Market: Despite the positive outlook, the industry faces hurdles such as fluctuating crude oil prices, which directly affect production costs. Supply chain disruptions and stricter environmental regulations on emissions from asphalt plants also pose challenges. However, the development of greener solutions is expected to mitigate some of these issues.

Key Market Trends

• Infrastructure Investments: Government-backed projects continue to prioritize road construction and urban expansion, particularly in economic corridors like the EEC.

• Sustainable Solutions: The adoption of recycled asphalt and environmentally friendly production methods is on the rise, aligning with Thailand's sustainability objectives.

• Technological Developments: Innovations in polymer-modified and warm-mix asphalt are enhancing durability, reducing energy consumption, and improving performance in extreme weather conditions.

• Urbanization Growth: The increasing number of residential and commercial developments has fueled demand for asphalt in metropolitan and industrial areas.

• Regional Connectivity: The enhancement of trade routes and transportation infrastructure is supporting Thailand's integration into the broader Southeast Asian market.

Investment Prospects in Thailand's Asphalt Industry

• Recycled Asphalt Production: Establishing plants to manufacture recycled asphalt aligns with the rising preference for sustainable and cost-effective road materials.

• Polymer-Modified Asphalt (PMA) Facilities: The growing demand for high-performance paving materials presents opportunities for investment in

GOVERNMENT REGULATIONS IMPACTING THE MARKET

FUTURE OUTLOOK FOR THAILAND'S ASPHALT MARKET

PMA production.

• Infrastructure Development Partnerships: Participating in government-led projects, particularly those linked to the EEC and national road networks, offers lucrative prospects.

• Local Asphalt Manufacturing: Expanding domestic production capacity can reduce reliance on imports and meet growing demand.

• Eco-Friendly Asphalt Solutions: The development of low-emission technologies is crucial in meeting Thailand's environmental regulations.

Major Industry Players

Leading companies in Thailand's asphalt market include:

• Tipco Asphalt PCL – One of the country's largest asphalt producers, with a strong presence in road construction and maintenance.

• Siam Asphalt Public Company Limited – A major supplier of asphalt for infrastructure projects across Thailand.

• Bangchak Corporation Public Company Limited – Engaged in both energy production and asphalt supply.

• Cemex Thailand – A provider of asphalt solutions as part of its broader construction materials portfolio.

• Thai Oil Public Company Limited – A key player in bitumen production, crucial to the region's asphalt supply chain.

These companies play an essential role in driving innovation, supporting infrastructure projects, and expanding Thailand's asphalt market.

Government Regulations Impacting the Market

The Thai government enforces stringent policies to ensure that asphalt production and application meet environmental and safety standards. Key regulatory bodies include:

• The Ministry of Transport: Oversees the quality and durability of asphalt used in road construction.

• The Pollution Control Department: Enforces emission restrictions on asphalt plants to minimize environmental impact.

• The Occupational Safety and Health Administration (OSHA): Establishes

PAVING SECTOR LEADING IN APPLICATION GROWTH

safety protocols for workers in asphalt production and application.

Additionally, regulations promote the use of recycled materials in asphalt production, further driving the market's shift toward sustainable solutions.

01

MAJOR INDUSTRY PLAYERS

02

Future Outlook for Thailand's Asphalt Market

The coming years hold promising prospects for Thailand's asphalt industry, with growth fueled by continued investments in infrastructure and urban development. As large-scale projects like the EEC progress and regional trade expands, demand for premium-quality asphalt will rise. The market is also expected to witness a stronger focus on sustainable construction practices, including recycled asphalt usage and eco-friendly production methods. Emerging technologies—such as polymer-modified and warm-mix asphalt—will enhance efficiency, reduce costs, and minimize environmental impact. Additionally, greater integration of digital technology in construction processes will improve project execution and precision.

As Thailand continues to upgrade its infrastructure and reinforce its role in regional trade, the asphalt sector is set to maintain steady growth, benefiting from both technological advancements and increased public-private partnerships.

Dominance of Paving Petroleum Asphalt

Industry analysis indicates that petroleum-based paving asphalt remains the dominant segment due to its durability and cost-effectiveness in large-scale infrastructure projects. As Thailand prioritizes the construction of highways, urban roads, and bridges, demand for petroleum asphalt continues to rise. The use of polymer-modified and warm-mix asphalt is also growing, as these technologies enhance road longevity and sustainability.

Paving Sector Leading in Application Growth

The increasing demand for high-quality paving materials is driven by Thailand's extensive urbanization and infrastructure modernization efforts. As cities expand and transportation networks improve, asphalt remains the preferred material for road construction.

Government-led initiatives focused on enhancing road durability and safety have accelerated the adoption of advanced paving technologies. Polymer-modified and warm-mix asphalt continue to gain traction, providing cost-efficient, long-lasting, and environmentally friendly solutions for Thailand's road infrastructure.

BORAL UNVEILS AUSTRALIA'S FIRST CRUMBED RUBBER ASPHALT SURFACING MADE FROM HEAVY-DUTY INDUSTRIAL TYRES

Boral Limited ("Boral") has introduced a groundbreaking crumbed rubber asphalt bitumen in Australia, pioneering the use of Off the Road (OTR) tyres—those utilized by heavy-duty industrial vehicles—instead of the conventional crumbed rubber. This innovative asphalt composition significantly enhances resistance to cracking and extends pavement durability, potentially doubling the lifespan of standard road treatments.

OTR tyres are specifically engineered to endure extreme conditions and bear the weight of massive machinery employed across multiple industries, including mining, construction, manufacturing, agriculture, and aviation. These tyres vary in size, ranging from under 20 cm for forklift tyres to nearly two meters for mining dump trucks.

Boral's high-binder crumbed rubber asphalt surfacing integrates end-of-life OTR tyres, sourced from quarry haul dump trucks and front-end loaders operating at Boral facilities. The presence of crumbed rubber in asphalt helps slow pavement degradation by counteracting oxidation—a primary cause of road deterioration due to UV exposure. With each OTR tyre, around two-thirds of its material is repurposed for Boral's asphalt mix, translating to roughly 400 kilograms of recovered rubber per tyre.

The introduction of this new product follows Boral's collaboration with the Australian Flexible Pavement Association (AfPA) and Tyre Stewardship Australia on a research project aimed at optimizing asphalt mixes derived from OTR tyres. This initiative sought to create more durable and environmentally sustainable roads. Subsequently, Boral partnered with Sunshine Coast Council to conduct a trial across three different locations—Railway Parade in Glass House Mountains, Spalls Road in Diddillibah, and Perlan Street in Nambour—evaluating its performance under various traffic conditions.

Boral's high-binder crumbed rubber asphalt surfacing integrates end-of-life OTR tyres, sourced from quarry haul dump trucks and front-end loaders operating at Boral facilities.

In total, Boral laid 7,000 square meters of local road surfaces, incorporating 10,000 kilograms of OTR-based crumbed rubber. The project utilized the equivalent of 25 large earthmover tyres, marking the first documented application of OTR-derived rubber in Australian asphalt surfacing.

This innovative road material enhances road resilience and performance while delivering economic benefits to both customers and road users. Over the road's lifespan, the need for maintenance, such as crack sealing and patchwork, is significantly reduced, lowering both costs and disruptions for communities. Additionally, the product supports broader sustainability efforts, cutting emissions and promoting responsible waste management.

Richard Pearson, Boral's Executive General Manager of Asphalt, emphasized the company's commitment to sustainable innovation, stating:

"We take pride in leading the way in construction material advancements with our high-binder crumbed rubber asphalt, developed from Off the Road tyres. Sustainability and fostering a circular economy are core to Boral's mission."

He further highlighted the collaborative effort with Sunshine Coast Council, AfPA, and Tyre Stewardship Australia in developing a solution that enhances environmental benefits while repurposing tyres that would otherwise end up in landfills. Pearson noted that Boral's operations will also see reduced emissions from asphalt production, thanks to the reuse of OTR and truck tyres sourced from its own sites.

"We anticipate continued advancements in the construction and infrastructure sector. We encourage councils and all levels of government to integrate recycled materials into their projects, including crumbed rubber asphalt, to drive sustainable progress."

RHEOLOGICAL CHARACTERISTICS

BITUMEN AGING PROCESS

MAIN COMPONENTS AND THEIR EFFECTS

PERTAMINA ACCELERATES OIL EXPLORATION AFTER US WITHDRAWS FROM THE PARIS AGREEMENT

To enhance bitumen's ability to resist aging, researchers have experimented with various modifying agents, including polymers, nanomaterials, and crumb rubber. These enhancements improve rheological behavior and overall pavement resilience against environmental challenges.

The lifespan of asphalt mixtures is largely determined by both environmental influences and traffic stresses. Elevated temperatures can cause bitumen to soften, reducing the stiffness of asphalt and increasing susceptibility to rutting, whereas lower temperatures make it more rigid, leading to fatigue-induced cracking.

This discussion explores the durability of bitumen and asphalt mixtures, the aging process, and the different methods used to evaluate and mitigate aging-related deterioration.

Rheological Characteristics

"Modifications using materials such as styrene-butadiene-styrene (SBS) and ethylene-vinyl acetate (EVA) have been shown to enhance high-temperature performance and extend fatigue life."

Bitumen, a viscoelastic substance primarily obtained from crude oil, is essential for ensuring asphalt pavements perform effectively. Its chemical makeup, which varies depending on the source, directly affects its behavior in diverse conditions.

Several environmental factors, including oxygen exposure, ultraviolet radiation, and extreme temperatures, can alter bitumen's properties, influencing the durability of pavement structures.

Main Components and Their Effects:

- Carbon and Hydrogen: Fundamental elements that dictate key rheological attributes.
- Sulfur, Oxygen, and Nitrogen: Minor constituents that contribute to aging and performance variations.
- Trace Metals: Elements such as vanadium, nickel, and manganese, which affect chemical stability and bitumen's overall performance.

Bitumen Aging Process

Over time, bitumen undergoes aging through two major phases: an initial short-term aging stage occurring during the mixing and construction process, and a long-term aging phase that develops gradually throughout the pavement's service life.

Both stages contribute to a rise in viscosity and stiffness, which can result in a brittle pavement surface prone to cracking.

- Short-Term Aging: Occurs due to the loss of volatile components during the production and construction phases.
- Long-Term Aging: Gradual oxidation of bitumen over time increases viscosity and stiffness, affecting pavement integrity.

Methods for Assessing Bitumen Aging

To analyze the aging process and

Q1 2025 BITUMEN MARKET SUMMARY REPORT

AHMAD REZA YOUSEFI
RAZIEH GILANI

Ahmad Reza Yousefi, managing director of Infinity Galaxy and a PhD candidate in international entrepreneurship, has more than a decade of experience in exporting bitumen and petrochemicals. He leads a passionate team dedicated to boosting his country's economy through exports. His focus on fostering trust with clients and providing outstanding service is paramount. For the last four years, he has ensured his clients remain informed about industry changes, trends, and market insights to facilitate sound business decisions.

Infinity Galaxy also boasts a specialized team focused on Asian markets exclusively India, offering tailored support to importers to help them make timely and informed decisions.

Razieh Gilani, the export manager at Infinity Galaxy, brings over eight years of experience in the bitumen market and shipping industries. Her expertise lies in the export, trade, and shipping of bitumen and petrochemicals, particularly in markets throughout Africa, China, India, and East Asia. For over past 200 weeks, she has been providing valuable market analysis to assist industry stakeholders in making informed decisions based on the latest trends. Collaborating with a skilled team of professionals with significant commercial knowledge, she effectively tackles market challenges by delivering in-depth insights and strategic advice.

This comprehensive report analyzes the global bitumen and crude oil markets throughout the first quarter of 2025. It captures weekly developments, explores price behaviors across key global markets, and offers a detailed regional assessment with emphasis on Iran. This document is prepared to support decision-making for stakeholders involved in production, export, import, logistics, and investment planning.

1. Fundamental Crude Oil Market Overview

The global crude oil market in Q1 2025 was shaped by persistent geopolitical tensions and mixed signals from the global economy. One of the dominant developments was the return of Donald Trump to the U.S. presidency, triggering immediate uncertainty across the oil and energy sectors. Policies involving tariff wars with China, Canada, Mexico, and the EU had a notable cooling effect on market sentiment, while efforts to restart stalled negotiations in the Middle East and Eastern Europe added to the volatility.

Simultaneously, supply-side pressures continued to shape price behaviors. Increased production from non-OPEC+ countries and surging U.S. output placed a ceiling on global prices. According to EIA estimates, U.S. crude oil production rose to a record high of 13.55 million barrels per day. Analysts from Reuters and multiple financial institutions repeatedly revised their price forecasts downward during the quarter.

Despite regional disruptions—such as the blockage of Russia's gas transit through Ukraine and military escalations in the Middle East—the price of Brent crude oil fluctuated mostly between $65 and $82. Temporary price surges were observed in mid-January and mid-March, driven by extreme weather events and speculative buying. However, such gains were often reversed by concerns over rising inventories or weakened demand, especially from China.

2. Key Influencing Factors

Several factors collectively influenced the global crude and bitumen markets during Q1 2025. These are ranked based on their sustained impact and the scope of their influence:

1. U.S. Geopolitical Policies: Trump's aggressive reimplementation of the 'maximum pressure' campaign on Iran, his tariff escalations with multiple countries, and his political threats against global alliances such as NATO and OPEC created waves in the energy market.

2. Ongoing War Between Russia and Ukraine: Now entering its third year, the conflict disrupted energy logistics, particularly in Europe. Bitumen prices were indirectly affected through uncertainty in regional transport and export routes.

3. OPEC+ Decisions: Despite U.S. pressure, OPEC+ remained largely committed to its supply quotas. However, internal debates, especially over voluntary production cuts, kept the market on edge.

4. Demand Shifts in Asia: India showed consistent interest in bitumen imports, while China's post-COVID recovery failed to ignite expected demand levels, due to both macroeconomic concerns and growing EV adoption.

5. Currency and Seasonal Trends: Exchange rate volatility—especially depreciation of the Iranian Rial—along with winter-related refinery demand created localized supply gaps and price mismatches.

3. Regional Bitumen Price Trends

Bitumen prices during Q1 2025 fluctuated across global markets, driven by geopolitical news, supply disruptions, currency instability, and seasonal demand variations. The following regional analysis provides an overview of the price dynamics in key markets:

- Singapore: Bitumen prices ranged between $428 and $460 per ton. Prices peaked in mid-February and remained relatively elevated, fueled by stable demand and delayed supply adjustments.

- South Korea: Prices showed modest volatility, moving from $405 to $425. Although demand remained steady, currency effects and inventory cycles affected weekly adjustments.

- Bahrain: For nearly three months, prices stayed fixed at $395, until early February when a $25 surge lifted them to $420. The region reflects long-term contract pricing models rather than spot dynamics.

- Europe: European prices showed broader fluctuation, ranging between $410 and $480. Political and tariff issues, along with cold-weather demand, introduced short-term spikes.

- India: The most volatile market in Q1. Bitumen prices initially dipped but surged by mid-March due to refinery-driven price hikes and recovering construction activity.

Week	Singapore	South Korea	Bahrain	Europe	India
Jan 2	$435	$405	$395	$410-440	$1 ↑
Jan 16	$415	$405	$395	$410-460	$3 ↓
Feb 6	$445	$420	$420	$430-470	Stable
Feb 20	$445	$425	$420	$430-470	$1.5 ↑/$4 ↓
Mar 13	$449	$415	$420	$410-440 ↓	$10 ↑
Mar 27	$425	$405	$420	$420-450 ↑	Expected ↑

4. Iran Market Analysis

Iran's bitumen market exhibited several unique behaviors due to local economic pressures, foreign sanctions, and administrative pricing reforms. Despite global trends, Iranian prices remained relatively stable, buoyed by continued domestic competition among refineries and increased end-of-year export urgency.

A key driver was the Rial's depreciation against the US Dollar, which failed to suppress prices because of internal factors like heightened competition over vacuum bottom,

limited logistics capacity at southern ports, and regulatory bottlenecks. Weekly competitions saw up to 29% premium bidding, with persistent 20-26% competition continuing throughout March, culminating in congested terminals and rising demand.

The state-mandated pricing formula for bitumen also played a stabilizing role. Despite fluctuations in feedstock and foreign exchange, this formula helped contain panic reactions. However, the market remains fragile, and minor shifts in regional geopolitics or trade routes could rapidly affect Iran's pricing and export capacity.

5. Conclusion & Outlook

Q1 2025 was marked by political disruption, mixed economic indicators, and unsteady energy policies, especially under the newly elected U.S. administration. Global crude oil and bitumen prices reflected both short-term pressures and long-term uncertainties.

Looking ahead to Q2 2025, several trends warrant close attention:

1. The implementation of OPEC+ voluntary cuts and their enforcement could shape global supply/demand dynamics significantly.

2. U.S.-China and U.S.-EU tariff conflicts may slow economic recovery, reducing energy consumption and speculative confidence.

3. Middle Eastern tensions—including continued unrest in Gaza, Yemen, and potential new conflicts—remain key price drivers.

4. For Iran, logistical readiness post-holidays, Rial valuation, and export logistics will be crucial for maintaining bitumen trade volumes and price competitiveness.

Note: Sections that were editorially adjusted or rewritten for clarity or grammar have been marked using red font where applicable. You may further review and customize these areas as needed.

2025年第一季度沥青市场总结报告

艾哈迈德·礼萨·尤塞菲 – 拉齐耶·吉拉尼
Infinity Galaxy

引言

Infinity Galaxy 董事总经理艾哈迈德·礼萨·尤塞菲（Ahmad Reza Yousefi）是国际创业博士候选人，拥有十多年沥青与石化出口经验，致力于通过出口促进国家经济。他领导一个热情的团队，以客户信任与卓越服务为核心，连续四年为客户提供行业趋势与市场洞察。

Infinity Galaxy 同时设有专门的亚洲团队，特别聚焦印度市场，提供定制化支持，协助进口商做出及时、明智的决策。

拉齐耶·吉拉尼（Razieh Gilani）作为出口经理，拥有八年多沥青与航运经验，专注于非洲、中国、印度及东亚市场，在过去200多周内持续提供趋势分析及战

略建议，助力企业有效应对市场挑战。

1. 原油市场基本面概览

2025年第一季度，全球原油市场受到持续的地缘政治紧张局势与复杂经济信号影响。唐纳德·特朗普重新担任美国总统，引发油气行业不确定性。其与中国、加拿大、墨西哥和欧盟的关税战影响市场信心，而中东与东欧谈判的不确定性加剧波动性。

供应方面，非OPEC+国家增产及美国创纪录的日产量（1355万桶）限制价格上涨。EIA与路透社分析师多次下调价格预期。

尽管俄罗斯天然气输欧中断与中东局势紧张，布伦特原油价格大多徘徊于65至82美元之间，1月与3月中旬的短暂上涨被库存上升与中国需求疲软所抵消。

2. 关键影响因素

主要影响因素按影响力排序如下：

1. 美国地缘政策：包括对伊朗的极限施压、对多国关税提升及对NATO和OPEC的政治威胁。

2. 俄乌战争持续三年，扰乱欧洲能源物流，间接影响沥青出口路径。

3. OPEC+维持配额，但对自愿减产的内部讨论使市场保持紧张。

4. 亚洲需求：印度沥青需求稳定，而中国因宏观经济与电动车普及，需求低于预期。

5. 汇率与季节性：特别是伊朗里亚尔贬值与冬季需求影响本地供需。

3. 区域沥青价格趋势

- 2025年第一季度全球沥青价格波动如下：
- 新加坡：428至460美元/吨，2月中旬达到高点。
- 韩国：405至425美元/吨，受汇率与库存周期影响。
- 巴林：近三个月稳定在395美元，2月初涨至420美元。
- 欧洲：410至480美元，因政治与天气需求波动剧烈。
- 印度：最为波动，3月中旬因炼厂提价及施工复苏上涨。

周	新加坡	韩国	巴林	欧洲	印度
1 月 2 日	$435	$405	$395	$410-440	$1 ↑
1 月 16 日	$415	$405	$395	$410-460	$3 ↓
2 月 6 日	$445	$420	$420	$430-470	稳定
2 月 20 日	$445	$425	$420	$430-470	$1.5 ↑/$4 ↓
3 月 13 日	$449	$415	$420	$410-440 ↓	$10 ↑
3 月 27 日	$425	$405	$420	$420-450 ↑	预计上涨

4. 伊朗市场分析

伊朗沥青市场呈现独特行为，受到经济压力、制裁及政策调整影响。

尽管全球趋势波动，伊朗价格因炼厂竞争、真空底竞价高达29%、港口瓶颈等因素保持稳定。国家定价机制稳定情绪，但市场依旧脆弱，任何地区性变化都可能引发波动。

5. 结论与展望

2025年第一季度政治与经济不稳，反映在沥青与原油价格中。

展望2025年第二季度，应关注以下趋势：

1. OPEC+自愿减产的执行情况；
2. 美中与欧美关税冲突对经济恢复的影响；
3. 中东紧张局势（如加沙、也门）；
4. 伊朗的物流准备、汇率及出口稳定性。

its impact on pavement longevity, various testing approaches have been developed. Traditional penetration and ductility assessments have been supplemented with advanced rheological techniques, such as the dynamic shear rheometer (DSR), to evaluate complex modulus and phase angle.

Key Evaluation Techniques:

- Dynamic Shear Rheometer (DSR): Determines complex modulus and phase angle, providing insight into deformation resistance and elasticity.
- Thin-Film Oven (TFO) & Rolling Thin-Film Oven (RTFO): Simulate short-term aging effects.
- Pressure Aging Vessel (PAV): Replicates long-term aging conditions.
- Bending Beam Rheometer (BBR): Measures bitumen's performance at low temperatures.
- Multiple Stress Creep Recovery (MSCR) Test: Evaluates bitumen's resistance to permanent deformation under repeated loading.

Advancements in Bitumen Modification

To enhance bitumen's ability to resist aging, researchers have experimented with various modifying agents, including polymers, nanomaterials, and crumb rubber. These enhancements improve rheological behavior and overall pavement resilience against environmental challenges.

Notable Modifications:

- Polymer-Enhanced Bitumen: Increases high-temperature stability and flexibility.
- Nanomaterial Additives: Strengthen fatigue resistance and mitigate rutting.
- Crumb Rubber Incorporation: Enhances viscosity and elasticity, reducing aging effects.
- Graphene Nanoplatelets (GNPs): Improve mechanical properties and oxidative aging resistance.

Real-World Applications and Case Studies

Extensive research has confirmed the benefits of these modifications in practical scenarios. The incorporation of polymer-infused nanoclays and crumb rubber has yielded significant improvements in asphalt mixture longevity.

Key Findings from Case Studies:

- Polymer-Based Bitumen: Modifications using materials such as styrene-butadiene-styrene (SBS) and ethylene-vinyl acetate (EVA) have been shown to enhance high-temperature performance and extend fatigue life.

- Nanotechnology in Bitumen: Studies on nano-silica and nano-titanium dioxide (TiO_2) have demonstrated improved ultraviolet resistance and mechanical durability.

• Rubberized Asphalt: Projects utilizing crumb rubber have reported reduced rutting and greater flexibility, especially in regions experiencing extreme climate variations.

Advanced Rheological Testing for Bitumen

To deepen the understanding of bitumen aging and identify ways to mitigate its effects, specialized rheological testing techniques are employed. These methods provide detailed data on viscoelastic behavior under different conditions.

Common Rheological Assessments:

• Frequency Sweep Analysis: Measures complex modulus and phase angle over varying loading frequencies to assess time-dependent characteristics.

• Temperature Sweep Evaluations: Examine bitumen's properties across different temperatures to determine performance under diverse climatic conditions.

• Time-Temperature Superposition (TTSP): Uses frequency and temperature data to construct master curves predicting long-term behavior.

The Influence of Additives on Bitumen Properties

Additives are instrumental in enhancing bitumen's durability, improving adhesion, and reducing oxidation-related degradation. These include anti-stripping agents, antioxidants, and reinforcing fibers.

Commonly Used Additives:

• Anti-Stripping Agents: Improve the bond between bitumen and aggregates, minimizing moisture-related damage.

• Antioxidants: Slow down oxidative aging by stabilizing bitumen's chemi-

ADVANCEMENTS IN BITUMEN MODIFICATION

NOTABLE MODIFICATIONS

cal composition.

- Fibers: Strengthen the bitumen structure, boosting tensile resistance and crack prevention.

Environmental Considerations and Sustainable Practices

Sustainability and environmental responsibility are becoming key priorities in asphalt pavement engineering. Researchers are increasingly focusing on eco-friendly materials and recycling strategies to reduce the ecological impact of bitumen production and use.

Sustainable Solutions:

- Reclaimed Asphalt Pavement (RAP): Reutilizing aged asphalt to minimize waste and preserve natural resources.
- Warm Mix Asphalt (WMA): Incorporating additives to lower production and compaction temperatures, thereby reducing emissions and energy consumption.
- Bio-Based Modifiers: Investigating renewable alternatives, such as bio-oils and lignin, to improve the environmental footprint of bitumen.

Future Directions in Bitumen Research

Ongoing innovations in bitumen technology are crucial for extending pavement lifespan and performance. Future research efforts should focus on microstructural analysis, predictive modeling, and the development of novel materials to counteract aging effects.

Prospective Research Areas:

- Microstructural Examination: Utilizing advanced imaging techniques such as atomic force microscopy (AFM) and X-ray micro-computed tomography (Micro-CT) to analyze aging at a microscopic level.

Both stages contribute to a rise in viscosity and stiffness, which can result in a brittle pavement surface prone to cracking.

- Predictive Aging Models: Developing sophisticated algorithms to estimate bitumen's long-term behavior based on chemical and rheological properties.
- Emerging Material Innovations: Exploring the potential of cutting-edge materials like graphene and bio-based polymers to enhance sustainability and performance.

The Evolution of Pavement Engineering

The longevity of bituminous pavements is largely dictated by environmental influences and the aging process. With the help of advanced evaluation techniques and material modifications, researchers are continuously improving asphalt's durability. A deeper understanding of bitumen's interactions with external conditions is vital for constructing resilient roadways.

As global demand for sustainable infrastructure grows, the importance of continued research in bitumen technology cannot be overstated. By integrating novel materials, innovative testing protocols, and environmentally conscious practices, the future of road construction will see safer, more durable, and more sustainable asphalt surfaces.

PERTAMINA ACCELERATES OIL EXPLORATION AFTER US WITHDRAWS FROM THE PARIS AGREEMENT

PT Pertamina Hulu Energi (PHE) is set to aggressively conduct oil and gas (O&G) drilling. This decision comes in response to the United States (US) withdrawal from the Paris Agreement.

PHE's Director of Exploration, Muharram Jaya Panguriseng, believes that President Donald Trump's decision to pull the US out of the Paris Agreement requires a response from Indonesia.

According to him, Trump's move signals that the US will continue relying on fossil fuels, and therefore, Indonesia must also take a stance.

Muharram argues that it would be unfair if a major country like the US continues using fossil energy and even expands oil drilling, while Indonesia is expected to transition to renewable energy.

He emphasized that if Indonesia aims to become a developed country by 2045 and achieve 8% economic growth, exploring new energy sources through drilling is inevitable.

"Search, search, search for new energy sources. That's why, when the Paris Protocol is frequently downplayed, I honestly have my own program that directly addresses this—aggressive exploration drilling at PHE," he said during a Media Briefing in Badung, Bali, on (February 11, 2025).

Muharram further stated that to achieve energy self-sufficiency, PHE must take an active role in continuously searching for new oil and gas sources.

To achieve this, PHE has developed three key strategies to boost production. The first step is to maintain exploration activities in existing operational blocks.

PERTAMINA INTERNATIONAL

SHIPPING'S JOURNEY: COMMITMENT TO STRENGTHENING INDONESIA'S MARITIME INDUSTRY ON THE GLOBAL STAGE

As an integral part of Indonesia's national maritime ecosystem, PT Pertamina International Shipping (PIS) remains committed to elevating the country's presence on the international stage. By playing an active role as a global maritime logistics operator, PIS has demonstrated that Indonesia can compete internationally while earning the trust of global customers.

The company's ability to expand beyond Indonesia aligns with the government's efforts to promote investment and strengthen international cooperation. This expansion highlights Indonesia's potential and represents a significant step toward positioning the country as a strategic global partner. This vision is also reflected in the 100-day milestone of Indonesia's government, which emphasizes transformation, innovation, and hard work to serve the nation's best interests.

"In 2024, our revenue from non-captive markets increased by 64% compared to the previous year. This achievement reflects the growing trust of global customers in PIS," said Mohammad Resa, PIS Director of Risk Management, during the Fortune Summit 2025.

In his presentation, Resa emphasized that this success stems from PIS's strategic initiatives, including a deep understanding of global customer needs, the development of human resource capabilities, and enhanced fleet reliability. These efforts are further reinforced by business expansion strategies, such as establishing branch offices in Singapore, Dubai, and London, to broaden PIS's international market reach.

Through this approach, PIS has been able to adapt to global market demands and respond swiftly to customer needs. Today, PIS has successfully expanded its shipping routes to 65 countries, marking a significant milestone in its journey as a leading global maritime player.

TWO GLOBAL OIL AND GAS GIANTS OFFICIALLY APPLY FOR RESERVOIR MANAGEMENT PERMITS FOR CARBON STORAGE

Two global oil and gas giants operating in Indonesia, ExxonMobil and BP, have officially applied for permits to manage reservoir areas for carbon storage (Carbon Capture Storage).

According to the regulation outlined in the Minister of Energy and Mineral Resources (ESDM) Regulation No. 16 of 2024, this permit application will be treated similarly to the bidding process for oil and gas management areas conducted by the government.

Dadan Kusdiana, Acting Director General of Oil and Gas at the Ministry of Energy and Mineral Resources (ESDM), stated that bp has applied for a new area as a carbon storage site, while ExxonMobil will manage a reservoir in collaboration with Pertamina.

"BP has already sent a letter to the Minister of Energy and Mineral Resources to process the permit. I just received it yesterday. Exxon as well. So far, these two companies have made progress," Dadan said when met at the ESDM Ministry office in Jakarta on (January 10).

Carbon storage is planned to be discussed annually, similar to the Work Plan & Budget (WPNB) discussions in the oil and gas sector.

"We are still refining the regulations, but the indication is that it will be similar to WPNB. So, there will be an annual plan. However, the process will be simpler," Dadan explained.

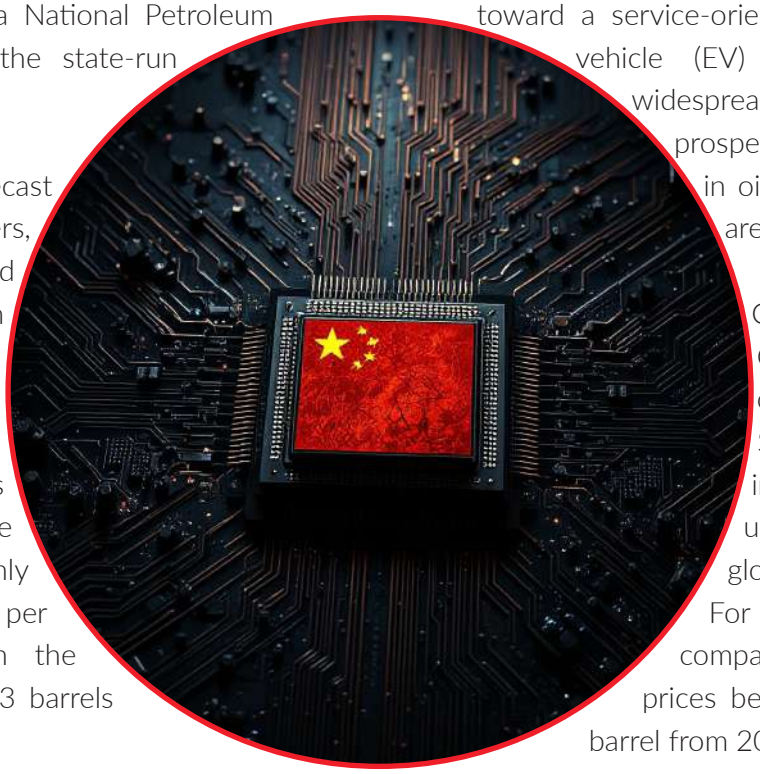
He is optimistic that many companies or entities will take the initiative to manage reservoirs for carbon storage. Pertamina, for instance, could benefit the most from the carbon capture and storage (CCS) business, as it holds numerous management rights over old reservoirs with depleting or exhausted reserves, which could be repurposed for carbon storage.

"For reservoirs that no longer contain oil and gas, this presents a dual benefit—first, extracting the remaining oil and gas, and then repurposing the reservoir for carbon storage.
That's the basic concept," Dadan concluded

We are still refining the regulations, but the indication is that it will be similar to WPNB.

CNPC PROJECTS 1.1% INCREASE IN CHINA'S OIL CONSUMPTION FOR 2025

China's oil demand is set to rise by 1.1% in 2025, driven by unexpectedly robust economic expansion and surging need for petrochemicals, according to projections from China National Petroleum Corporation (CNPC), the state-run energy conglomerate.



In its recent forecast shared via Reuters, CNPC's Economics and Technology Research Institute (ETRI) estimates the nation's oil usage will climb to 765 million metric tons this year. This volume translates to roughly 15.36 million barrels per day (bpd), based on the conversion rate of 7.33 barrels per ton.

Wu Mouyuan, deputy head of CNPC's research arm, stated that China's demand for transportation fuels has already peaked.

Nonetheless, the appetite for petrochemical products continues to rise, with China's current per capita consumption at only about 60% of the level seen in advanced economies—leaving considerable room for growth in this sector.

The International Energy Agency (IEA) echoes CNPC's view, asserting that China's oil demand related to fuel consumption has likely reached its highest point. According to IEA analysts, as the Chinese economy gradually shifts away from industrial production toward a service-oriented model, and electric vehicle (EV) usage becomes more widespread in transportation, the prospects for further expansion in oil demand for combustion are diminishing.

On the pricing front, CNPC anticipates Brent crude to stay within the $65–$75 per barrel range in 2025, citing ongoing uncertainty surrounding global economic conditions. For the medium term, the company forecasts average prices between $60 and $70 per barrel from 2026 to 2030.

However, CNPC considers former U.S. President Donald Trump a major wildcard in the global oil market, with the potential to cause significant fluctuations depending on his stance regarding international trade and sanctions. Wu emphasized during the outlook event that "Trump's influence represents the greatest unknown for oil price stability."

"The Trump factor will be the biggest uncertainty for the oil market," the think tank's Wu said at the outlook presentation, as carried by Reuters.

Russia Executes Uncommon Dual LNG

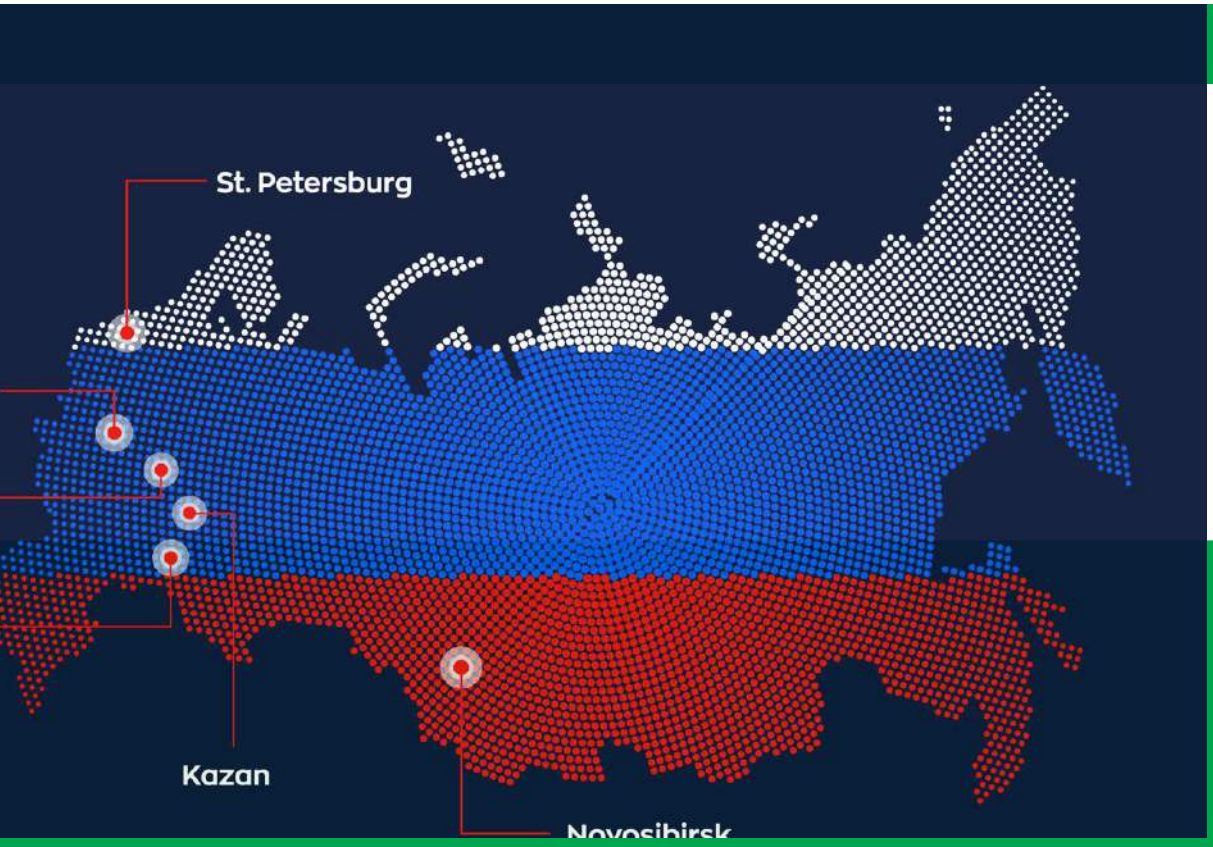
In response to the European Union's recent ban on the re-export of Russian liquefied natural gas (LNG), Moscow swiftly organized a rare double ship-to-ship (STS) transfer near Murmansk, deploying four LNG carriers for the operation. These vessels are transporting ultra-chilled gas sourced from the Yamal LNG project, which is managed by the Russian energy firm Novatek.

The ice-resistant Arc7-class LNG tankers, Nikolay Urvantsev and Vladimir Rusanov, both operated by Mitsui O.S.K. Lines Ltd, met up with the lower ice-class carriers, Lena River and Clean Vision, managed by Dynagas, to facilitate the cargo exchange. Satellite imagery and AIS tracking data confirm that the ships paired up in the waters just south of Kildin Island between March 28 and March 31. Typically, an STS transfer requires approximately 36 to 48 hours to complete.

The Lena River, which had originally departed from China in late December 2024, remained stationary for several weeks in northern European waters, including the Celtic, North, and Barents Seas, before moving into position. Meanwhile, Clean Vision set sail from Mirs Bay near Shenzhen at the end of February. The Nikolay Urvantsev and Vladimir Rusanov, on the other hand, recently left the Yamal LNG terminal, carrying fresh shipments of liquefied gas.

Until recently, Novatek had been utilizing

Transfer to Bypass New EU Sanctions



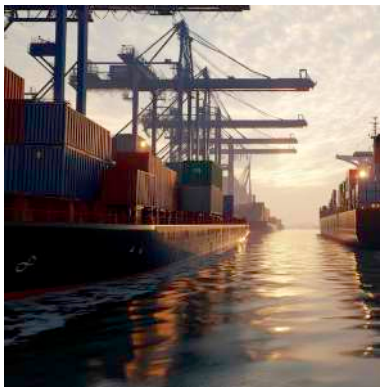
Fluxys' Zeebrugge terminal in Belgium for the majority of its reloaded LNG shipments, with additional volumes handled through Montoir, France. However, as of March 27, these locations have become inaccessible due to the EU's 14th package of sanctions, which prohibits the handling of Russian LNG at European terminals.

Before 2020, Novatek frequently carried out STS operations in northern Norway, near Honningsvåg, facilitating the transshipment of dozens of LNG cargos between 2018 and 2020. However, growing political pressure, including strong opposition from U.S. officials, made continued use of this location impractical.

Under normal circumstances, Kildin Island serves as a seasonal transshipment hub, primarily in winter, to reduce the distance traveled by Arc7-class LNG carriers. Transferring LNG at Kildin instead of Zeebrugge cuts approximately four to five days off a roundtrip journey for these specialized ice-class vessels.

Over the past five years, Novatek has conducted an average of 12 STS transfers per year at Kildin. However, with the recent sanctions, this figure is projected to increase significantly. According to trade intelligence firm Kpler, 13 STS transfers have already taken place in the first quarter of 2025 alone, including the latest dual transshipment last weekend.

AI-Driven Technology Aims to Improve Naval Escort Security



For the protection of valuable naval assets like aircraft carriers, escort missions are necessary when navigating busy ports. Charles River Analytics has introduced the Perception Autonomy for Vessel Escorts (PAVE) system, an advanced automation solution designed to streamline this process by minimizing human involvement and accelerating mission execution.

The company has secured a Phase II contract under the Small Business Innovation Research (SBIR) program, funded by the Naval Sea Systems Command, with a potential value of $1.8 million.

Although similar technologies exist, current software for uncrewed surface vessels (USVs) struggles to accurately monitor small or fast-moving craft in densely populated harbors. Additionally, these systems lack the ability to properly assess potential risks, according to Charles River Analytics.

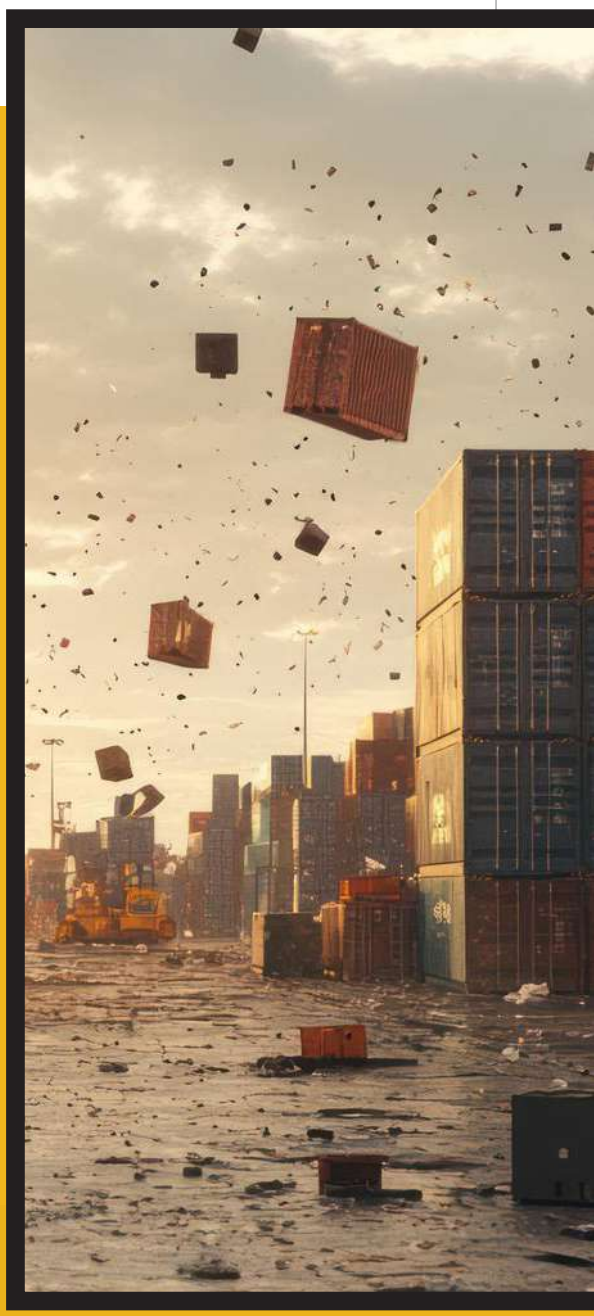
PAVE is built upon Awarion, an AI-powered autonomous surveillance system that supports human lookout personnel and marine radar systems in open waters.

"Awarion is capable of identifying, evaluating, and reporting the presence of marine life, vessels, and other objects at sea. However, we are enhancing it to function effectively in heavily trafficked harbor environments," explains Ross Eaton, Principal Scientist and Director of Marine Systems at Charles River.

By refining Awarion's capabilities, Eaton notes, "PAVE not only identifies the type and location of an object but also predicts its possible actions, allowing us to notify the appropriate personnel when necessary." Additionally, PAVE is designed to determine the exact distance of the objects it detects.

Harbor settings present unique challenges, as multiple activities occur simultaneously in the foreground and background. While human observers can easily differentiate between structures and vessels, an overwhelming amount of data can cause confusion for AI-based systems. One of PAVE's primary objectives is to enhance machine perception to better mimic human vision.

PAVE IS BUILT UPON AWARION, AN AI-POWERED AUTONOMOUS SURVEILLANCE SYSTEM THAT SUPPORTS HUMAN LOOKOUT PERSONNEL AND MARINE RADAR SYSTEMS IN OPEN WATERS.



Following the successful feasibility study in Phase I, Phase II will emphasize expanding PAVE's learning database with a diverse range of harbor-related imagery, including infrastructure elements such as docks and buildings. "We are intensifying our data collection efforts to include more complex environments with dense backgrounds and congested scenes," says Eaton.

Equipped with electro-optical (EO) and infrared (IR) detection, PAVE is designed to operate effectively in both daylight and nighttime conditions. "Instead of relying on multiple personnel aboard separate vessels, each with only a partial view of their surroundings, we are creating a unified visual framework. This system will detect and flag objects that require closer inspection, allowing for faster and more coordinated responses. Our goal is to combine human expertise with automation to develop the most efficient security solution possible," Eaton explains.

Charles River anticipates that the fully developed PAVE-enabled intelligent camera system will provide immediate advantages to the Maritime Expeditionary Security Force (MESF) as they refine their autonomous escort operations.

Eaton further states that the technology has sparked significant interest from both the U.S. Navy and private industry. Beyond military applications, PAVE's integration into smaller USV platforms could revolutionize harbor management and security operations.

Awarion (PAVE)

"We are intensifying our data collection efforts to include more complex environments with dense backgrounds and congested scenes," says Eaton.

Innovative Asphalt Evaluation: The Rutting Resistance Assessment

Rutting refers to the indented grooves that form along wheel paths in asphalt pavements due to prolonged exposure to traffic loads.

This deformation occurs when the pavement materials compress or shift under repeated stress, often caused by inadequate thickness, improper compaction, or mixtures lacking deformation resistance. Elevated temperatures can exacerbate the problem by weakening the binder, increasing susceptibility to shear damage.

While rutting was once a prevalent concern, experts now consider it largely under control, primarily due to breakthroughs from the Strategic Highway Research Program (SHRP) in the 1990s.

The development of performance-graded (PG) binders and Superpave mix designs has greatly enhanced pavement resilience under heavy loads and heat, minimizing severe rutting occurrences.

So, Why the Need for a New Test?

With transportation agencies increasingly adopting balanced mix designs to improve crack resistance, adjustments such as higher binder content or softer binders are common. While these modifications enhance flexibility, they may inadvertently increase rutting susceptibility if not properly evaluated.

Enter the IDEAL-RT (Rapid Shear Rutting Test), a cutting-edge performance assessment gaining traction among material testers and agencies. This method employs indirect tensile loading to apply cyclic stress to cylindrical asphalt samples, simulating the shear forces exerted by moving vehicles.

Advantages of IDEAL-RT Over Traditional Rutting Tests:

Advantages of IDEAL-RT Over Traditional Rutting Tests:

1. Faster results than wheel-tracking methods.

2. Simple execution with minimal setup requirements.

3. Cost-efficient compared to alternative tests.

4. Strong real-world correlation, backed by research validating its predictive accuracy.

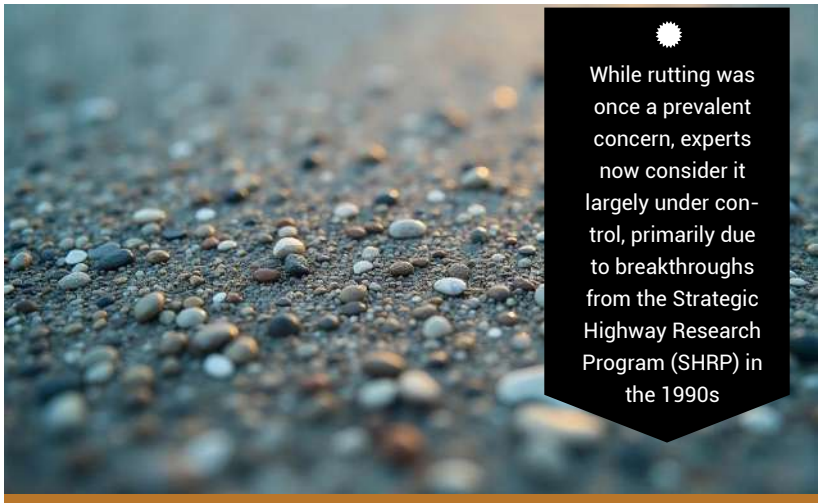
5. Works in tandem with the IDEAL-CT test for comprehensive performance analysis.

The IDEAL-RT effectively detects variations in reclaimed asphalt (RAP), recycled asphalt shingles (RAS), binder type and content, aggregate composition, air voids, and aging effects. With a variability coefficient under 10%, it aligns well with established tests like the Asphalt Pavement Analyzer (APA) and Hamburg Wheel Tracking Test (HWTD), as well as actual field performance.

Evolution of Rutting Testing Methods

- 1939: The Marshall Stability Test measured deformation resistance but wasn't rutting-specific.
- 1960s: Wheel-tracking tests, including HWTD, emerged to simulate traffic-induced rutting.
- 1980s: The APA used rolling wheels and rubber hoses to replicate traffic loads.
- 2000s: The AMPT incorporated dynamic modulus testing to evaluate stiffness and rutting behavior.
- 2010s: The IDEAL-RT introduced a rapid, practical indirect tensile test with high field correlation.

This progression reflects the ongoing refinement of asphalt testing to ensure durable, high-performing pavements.



While rutting was once a prevalent concern, experts now consider it largely under control, primarily due to breakthroughs from the Strategic Highway Research Program (SHRP) in the 1990s

RED STAG MATERIALS MARKS GLOBAL MILESTONE WITH EZ STREET ASPHALT DELIVERY TO HONG KONG

SINCE ITS INCEPTION IN 2018

IN THE MIDDLE EAST AND AFRICA

WPB: Red Stag Materials, a leading innovator in environmentally sustainable road maintenance solutions, has completed the third shipment of its EZ Street Asphalt to Hong Kong. This latest delivery highlights the company's growing global footprint as it continues to collaborate with international contractors to provide practical and eco-conscious road repair options.

Produced in Scotland, EZ Street Asphalt is among the UK's rare carbon-neutral pothole repair products. Known for its environmental benefits, user-friendly application, and long-term durability, the material has earned the trust of contractors worldwide. In Hong Kong, it is being utilized by a major infrastructure company responsible for maintaining the city's highways on behalf of the government. The product's ability to offer permanent, weather-resistant repairs has proven particularly useful in densely populated areas where traditional methods often fall short.

Red Stag's ongoing achievements in Hong Kong are part of its wider effort to introduce advanced road maintenance technologies to regions with infrastructure challenges. By supplying cold-lay asphalt that cuts emissions and minimizes worksite disruption, the company is raising the bar for roadwork efficiency.

Outside of Hong Kong, Red Stag has extended its operations into markets across the Middle East, Africa, and Europe. These diverse regions, each with their own climate and infrastructure demands, have adopted EZ Street Asphalt for its resilience, adaptability, and environmentally responsible profile. In the Middle East and Africa, a notable share of the product's demand has come from the oil and gas sector, where its ability to perform under harsh conditions is highly valued. Its quick-setting nature and capacity to be applied even in wet conditions have made it a valuable asset for minimizing downtime.

As part of a broader expansion strategy, Red Stag Materials is actively exploring new international partnerships to bring EZ Street Asphalt and its full range of road maintenance products to more markets. With a

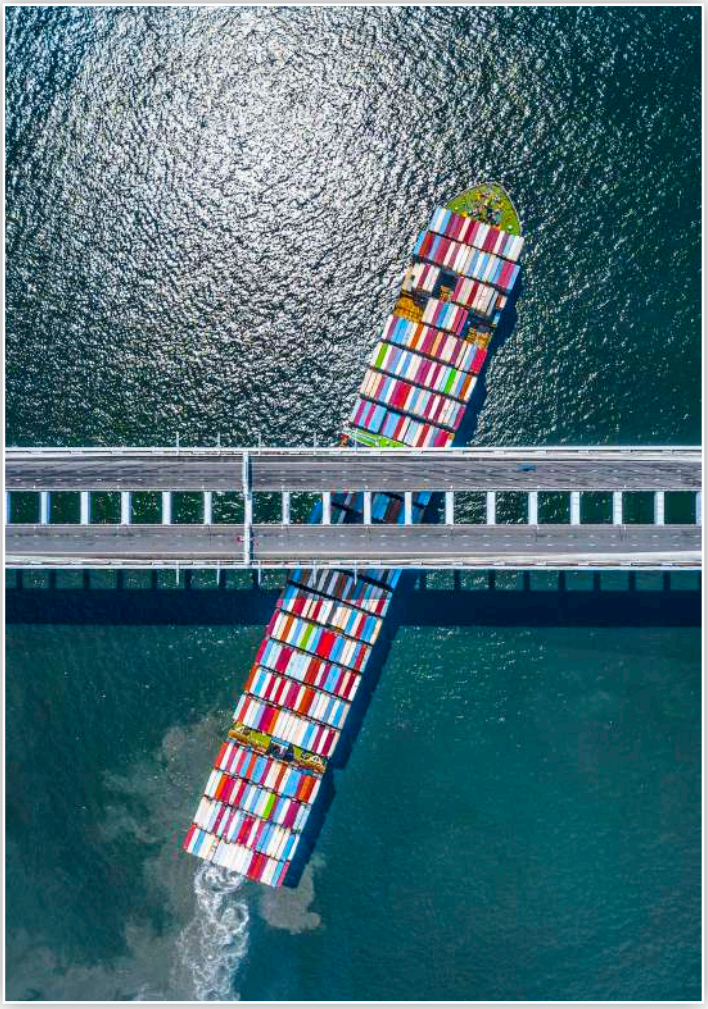
strong emphasis on innovation and sustainability, the company is well-positioned to influence the future of global infrastructure.

Since its inception in 2018, Red Stag has consistently expanded its product line to meet the evolving demands of road maintenance professionals. Its offerings now include advanced sealing solutions and thermoplastic materials for line marking, reinforcing its reputation for delivering cutting-edge, high-performance technologies.

Grant Shewan, Managing Director of Red Stag Materials, commented on the company's ongoing growth: "We're excited to continue building relationships with our clients overseas. This third shipment to Hong Kong demonstrates the rising demand for sustainable and effective road repair solutions around the world. We're eager to build on this momentum and further grow our export operations in 2025."

By supporting international efforts toward greener infrastructure, Red Stag's export strategy reflects its commitment to lowering carbon emissions and enhancing repair efficiency. With a strong foundation in sustainability, forward-thinking innovation, and client-focused service, the company is poised for continued international success as demand for environmentally friendly road repair materials continues to rise.

CMA CGM AND FRENCH AI FIRM MISTRAL JOIN FORCES TO ENHANCE CUSTOMER SUPPORT



WPB: The major shipping company CMA CGM and French artificial intelligence startup Mistral AI have launched a strategic alliance worth 100 million euros, expecting swift improvements in efficiency. the partnership also reflects the firms' loyalty to France during a time of heightened global trade tensions.

Spanning five years, the deal will raise CMA CGM's total investment in AI-related initiatives to 500 million euros ($550 million). The primary focus areas include optimizing customer service operations within shipping and logistics sectors, as well as improving fact-checking processes across CMA CGM's French media holdings, such as BFM TV.

In a joint discussion with Mistral's co-founder and CEO Arthur Mensch, CMA CGM's Chairman and CEO Rodolphe Saadé refrained from specifying financial expectations or returns on the investment. However, he noted that the rollout of new measures should be completed within six to twelve months. The goal is to significantly reduce response times for customer representatives who currently handle around one million email inquiries weekly, many involving ship routing queries.

The artificial intelligence industry, after receiving vast financial backing, now faces growing demand to produce measurable outcomes. Investor concerns have recently heightened following the rise of DeepSeek, an affordable AI model developed in China.

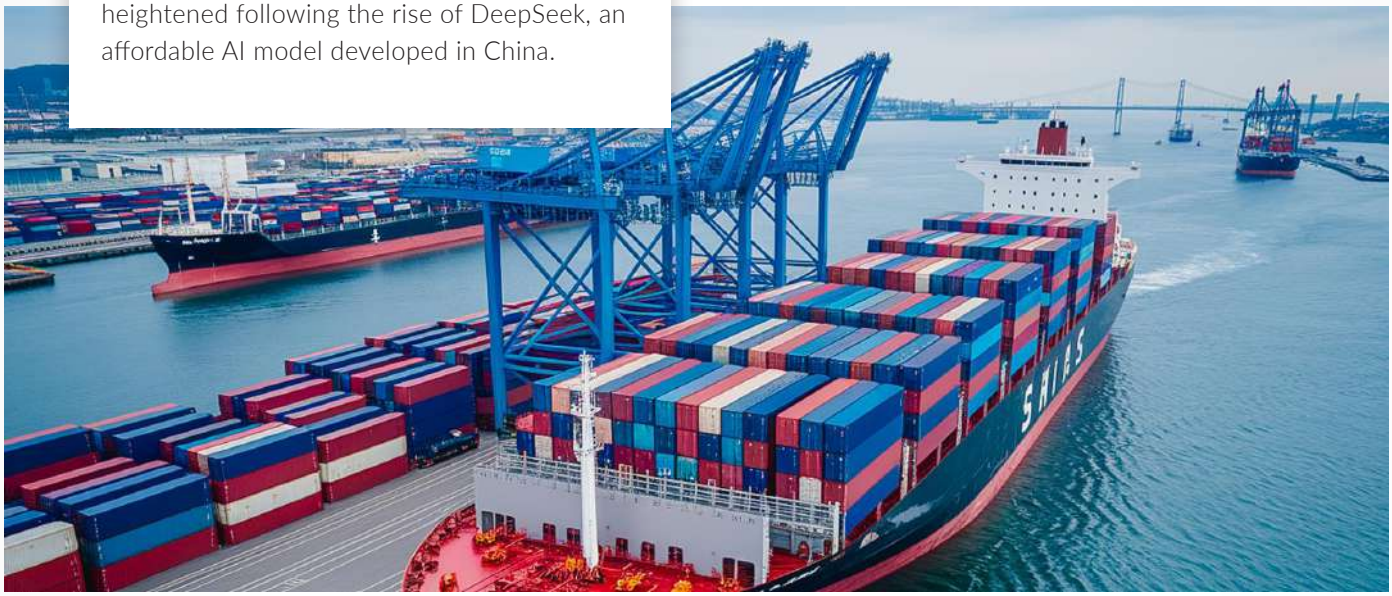
Mistral received major international attention during a global AI event in Paris this past February, where it was celebrated by President Emmanuel Macron as a European contender against dominant U.S. firms like OpenAI, the creator of ChatGPT.

CMA CGM-

SHIPPING COMPANY

The artificial intelligence industry, after receiving vast financial backing, now faces growing demand to produce measurable outcomes. Investor concerns have recently heightened following the rise of DeepSeek, an affordable AI model developed in China.

“Nonetheless, AI-related policy remains a point of contention between European authorities and the U.S. government. Tensions intensified after Donald Trump introduced sweeping new tariffs.”



So far this year, Mistral has secured collaborations with several top French corporations, including the automotive group Stellantis. CMA CGM, which is also among Mistral’s investors, is predicting a tenfold growth in revenue between December 2024 and December 2025, according to Mensch.

Nonetheless, AI-related policy remains a point of contention between European authorities and the U.S. government. Tensions intensified after Donald Trump introduced sweeping new tariffs.

“In these uncertain times, I see it as a positive move for two French companies to announce such a collaboration,” Saadé commented. Still, he emphasized his belief in investing across global, open markets.

CMA CGM, currently ranked as the third-largest container shipping company worldwide, received praise from Trump just last month for its pledge to invest $20 billion in the United States.

Additionally, the company has entered into partnerships with American tech firms, including Google’s parent company Alphabet. Back in July, CMA CGM and Google began a $150 million, five-year AI collaboration.

RADIATION RISK HIDDEN IN ASPHALT – A DANGEROUS DISCOVERY

WPB: Radioactive hot zones are silently forming beneath our roads. These aren't large reactors or military waste dumps—they stem from tiny bits of industrial waste containing uranium and radium, embedded directly into the asphalt. In some cases, these areas even emit toxic gases where the surface is damaged. One resident of Lower Austria discovered this unsettling truth purely by accident.

To save money, leftover substances from fertilizer production—specifically those tainted with radioactive radium—are being used in road construction. Rather than paying for proper disposal, some companies appear to be hiding the problem under our feet.

In a striking case, a dosimeter unexpectedly registered extreme radiation levels in the heart of a city. Panic followed. What force beneath the ground could produce such a dangerous emission? The radiation was so intense that lead sheets were laid over the site. When workers dug deeper, they found the culprit: a single piece of phosphogypsum, small but powerful, had slipped past machinery and kept its radioactive energy intact.

New Year's Celebration Uncovers a Hidden Hazard

This scenario mirrors an earlier case in Thuringia, Germany, from four years prior—one that was quietly forgotten. Asphalt materials are manufactured by wealthy industrial players. Demand is enormous. While research is ongoing, few question the ingredients used in these materials.

In Austria, there had been no public outcry over such contamination—until a man from Göllersdorf stumbled onto something unexpected. After celebrating New Year's Eve, he noticed he still had his company's dosimeter on him. During a casual stroll to watch fireworks, the device later revealed two massive radiation spikes. The celebration had turned into a shocking revelation.

Curious and concerned, he checked the area again and detected more elevated readings, especially around newly repaired asphalt sections. After reading about a similar incident in Germany, he began to

Meanwhile, Across the Ocean... It's Already Approved

suspect that phosphogypsum might be quietly finding its way into Austrian roads as well.

No Transparency from Asphalt Producers

There's little clarity about what exactly goes into the asphalt. While Austria imports 70,000 tons of phosphogypsum annually, there's no easy way to trace where it all ends up. Even directories of suppliers don't reveal who's using what.

Despite official claims that radiation levels are safe, experts know that when radioactive materials clump together, the emission levels increase dramatically. Yet, no one wants to take responsibility. Officials direct questions to contractors, who then deflect them to suppliers. Specific recipes used in asphalt production remain confidential and protected by industry secrecy.

Meanwhile, Across the Ocean... It's Already Approved

As Austria's asphalt output climbs to about seven million tons per year, the concerned citizens fear the situation might start to mirror what's happening in the U.S. Just last April, Florida approved the use of phosphogypsum in asphalt across the entire state—despite heavy public opposition.

This trend raises serious questions: are the Austrians paving their roads with materials that pose long-term risks to public health—and keeping it hidden?

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MALAYSIA BITUMEN MARKET: A COMPREHENSIVE ANALYSIS

Current Landscape of Malaysia's Bitumen Sector
WPB: Malaysia's bitumen industry is witnessing consistent growth, largely propelled by its expanding use in roadworks and infrastructure enhancements.

As the nation intensifies efforts toward urban expansion, highway construction, and maintaining existing public assets, the requirement for bitumen—an essential material in road surfacing—remains robust. Moreover, there is a growing inclination toward more resilient and eco-friendly paving solutions, such as polymer-modified bitumen, which is fostering innovation and modernization within the sector.

Refineries in Malaysia are adapting to this changing landscape by concentrating on the development of premium-quality bitumen products that align with higher performance and environmental criteria. However, the market continues to face persistent hurdles, including volatility in crude oil prices and ecological concerns associated with bitumen manufacturing. Nevertheless, the long-term outlook is favorable, as strategic infrastructure investments are expected to sustain demand for bitumen products across the country.

Understanding Malaysia's Bitumen Industry
Bitumen plays a critical role in Malaysia's construction and infrastructure sectors, serving as a vital component in road paving, roofing, and waterproofing applications. As a binding element in asphalt mixtures, bitumen significantly affects the durability and performance of infrastructure projects.

The market encompasses various bitumen grades, including penetration-grade, polymer-modified bitumen (PMB), and oxidized types. Each of these grades serves specific purposes, tailored to conditions requiring elasticity, weather endurance, and long-term functionality, thus meeting the needs of diverse construction activities.

Although primarily utilized in road development, bitumen also finds applications in waterproof

membranes and roofing systems, thanks to its sticky nature and water-repellent characteristics. This versatility makes it indispensable in both civil and commercial construction environments.

That said, bitumen's advantages come with notable challenges. While it offers a cost-effective and long-lasting solution, the environmental footprint of its production and the sensitivity of its pricing to oil market fluctuations pose issues. In response, research into bio-derived alternatives is gaining traction, aiming to introduce sustainable bitumen options and lessen environmental impact.

Market Value and Projections

The Malaysian bitumen sector was valued at nearly USD 450 million in 2023 and is forecasted to climb to USD 650 million by the year 2030, registering a compound annual growth rate (CAGR) of 4.3%. This anticipated growth is supported by rising urban development, continuous infrastructure expansion, and the growing demand for high-performance road materials.

By the end of the forecast period, large-scale public investments are expected to drive further adoption, especially of polymer-modified variants, which are set to claim a larger market share.

Emerging Trends in the Industry

One of the prominent shifts in the market is the rising preference for environmentally sustainable and low-emission materials. Increasing regulatory pressure and environmental awareness are encouraging the adoption of bio-based bitumen and greener production processes. Concurrently, advanced technologies, particularly in the formulation of polymer-modified bitumen, are improving road performance, minimizing upkeep expenses, and extending surface life.

Digital innovation is also reshaping the sector. Construction projects are increasingly incorporating digital tools to monitor and evaluate bitumen road performance in real-time, further optimizing maintenance and resource planning.

New Product Developments in the Malaysian Bitumen Market

- Shell Cariphalte High-Performance Bitumen: This advanced polymer-modified bitumen, engineered by

Market Value and Projections

Shell, is tailored for use in heavily trafficked roads. It delivers exceptional performance under severe weather, promising extended durability.
Expert Insight: The product is likely to capture greater market attention as it offers a longer life cycle and reduced long-term maintenance costs.

* Total Styrelf PMB: Designed for increased flexibility and deformation resistance, this bitumen is ideal for roadways enduring high traffic volumes.
Expert Insight: With Malaysia's cities expanding rapidly, this product is well-suited for urban infrastructure, where durability under pressure is crucial.

* ExxonMobil Bitumen EME: Targeted at high-load and performance-intensive paving projects, this formulation resists heavy wear efficiently.
Expert Insight: Its high-stress tolerance makes it a strong candidate for highways and airport runways across the country.

* Petronas Eco-Bitumen: Developed with a focus on sustainability, this bitumen lowers carbon emissions during manufacturing.
Expert Insight: In line with Malaysia's push for greener construction, this eco-conscious product is expected to see increased application in future developments.

* BP Asphalt Premier: Known for its superior water

Emerging Trends in the Industry

resistance, this versatile bitumen serves both infrastructure and building waterproofing needs.
Expert Insight: Its dual-purpose nature enhances its appeal across diverse construction segments, increasing its market utility.

Leading Companies in the Malaysian Bitumen Market

Key players operating within Malaysia's bitumen market include:

1. Shell
2. ExxonMobil
3. Petronas
4. TotalEnergies
5. BP
6. Tipco Asphalt Public Co. Ltd.
7. Nynas AB
8. Puma Energy
9. Indian Oil Corporation
10. Lotte Chemical

KKR to Use Specialty Mix Pavement Technology in 2025"

Super Fibre Mix (SFM), Stone Mastic Asphalt (SMA) Cuplump Modified Asphalt (CMA)

"

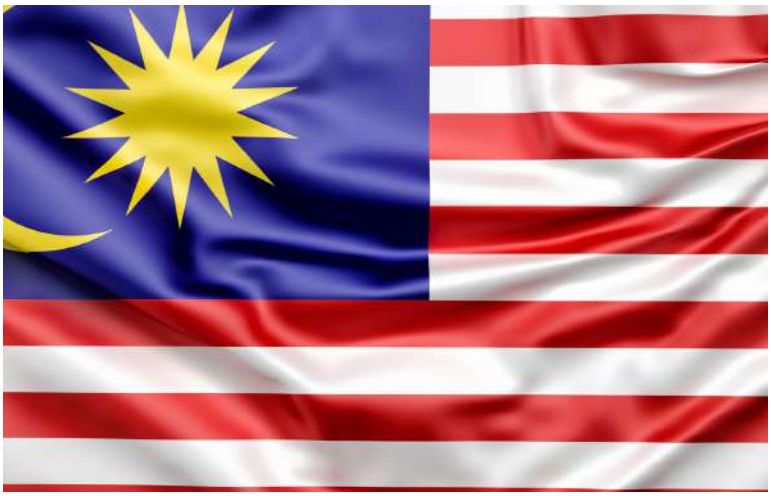
The Ministry of Works (KKR) will begin using a pavement technology known as "specialty mix" for road maintenance projects starting in early 2025.

Deputy Minister of Works, Datuk Seri Ahmad Maslan, explained that this initiative aims to enhance the durability of road structures, prolong the lifespan of roads, and resolve common damage issues, particularly in areas with frequent heavy vehicle traffic.

He mentioned that the decision was approved by the National Development Action Council (MTPN), chaired by Prime Minister Datuk Seri Anwar Ibrahim.

"The Prime Minister has called for the swift implementation of this (specialty mix) technology, and we can lower costs if it's done on a large scale.

"So beginning early 2025, all road maintenance works will follow a policy of using 50 percent specialty mix, while the other 50 percent will continue with conventional methods," he said during a press conference after a working visit to a processing facility.



Ahmad further explained that the specialty mix pavement technology involves adding modifiers to the base asphalt mixture, which typically includes bitumen and cement aggregates, to reinforce the final product.

"The government allocates billions of ringgit each year for road maintenance. It's only wise to start

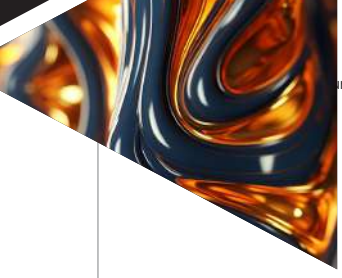
THE PRIME MINISTER HAS CALLED FOR THE SWIFT IMPLEMENTATION OF THIS (SPECIALTY MIX) TECHNOLOGY, AND WE CAN LOWER COSTS IF IT'S DONE ON A LARGE SCALE.

this immediately, especially after years of studying its application.

"We've tested this several times, and it's not new—we began trials six years ago. Now it needs to be fast-tracked and implemented in early 2025 to fix problems like potholes, cracks, and more," he added.

Currently, eight types of specialty mix pavement materials are in use in Malaysia: Super Fibre Mix (SFM), Stone Mastic Asphalt (SMA), Cuplump Modified Asphalt (CMA), Polymer Modified Asphalt (PMA), Latex Modified Asphalt (Latex), Crumb Rubber Modified Asphalt (CRMA), Fibre Modified Asphalt (FMA), and MR6-Plastic.

early
2025





U.S. Has the Power to Stop Iran's Oil Shipments Completely

The United States has the capability to bring Iranian oil exports to a complete halt if it ramps up pressure on Tehran to prevent the country from ever acquiring a nuclear weapon, said U.S. Secretary of Energy, Chris Wright, during his visit to Abu Dhabi, United Arab Emirates.

According to Secretary Wright, American allies in the Gulf—such as the UAE and Saudi Arabia—are deeply worried about the possibility of Iran becoming a nuclear-armed state. They firmly align with Washington's stance that Tehran must be barred from obtaining such a capability.

Wright is currently visiting the Middle East on his first official international trip since assuming office. During meetings with officials from Saudi Arabia, the UAE, and Qatar, his goal is to secure strong oil output from nations that are not restricted by U.S. sanctions, thereby maintaining a steady global oil supply.

Following the imposition of tighter restrictions on Iran's oil sector, the Trump administration also pushed for renewed diplomatic engagement with Tehran to address its nuclear ambitions.

As part of reinstating the "maximum pressure" approach against Iran, former U.S. President Donald Trump had instructed the Secretary of State to launch an aggressive and sustained initiative—alongside the Treasury Department and other government branches—to completely eliminate Iranian oil exports, including shipments to China.

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In the latest development, the U.S. and Iran are getting ready for high-level

nuclear discussions in Oman. Oman's Foreign Minister, Sayyid Badr Albusaidi, will serve as a mediator during these indirect negotiations between the two countries.

Ali Shamkhani, a prominent adviser to Iran's Supreme Leader Ayatollah Ali Khamenei, announced via X that Iran's foreign minister would travel to Oman with full negotiating authority for the upcoming talks.

"Iran is looking for a genuine and fair agreement—free from public theatrics and political slogans. Concrete proposals have been prepared. If Washington demonstrates genuine intent to reach an accord, the road to a resolution will be open," Shamkhani stated.


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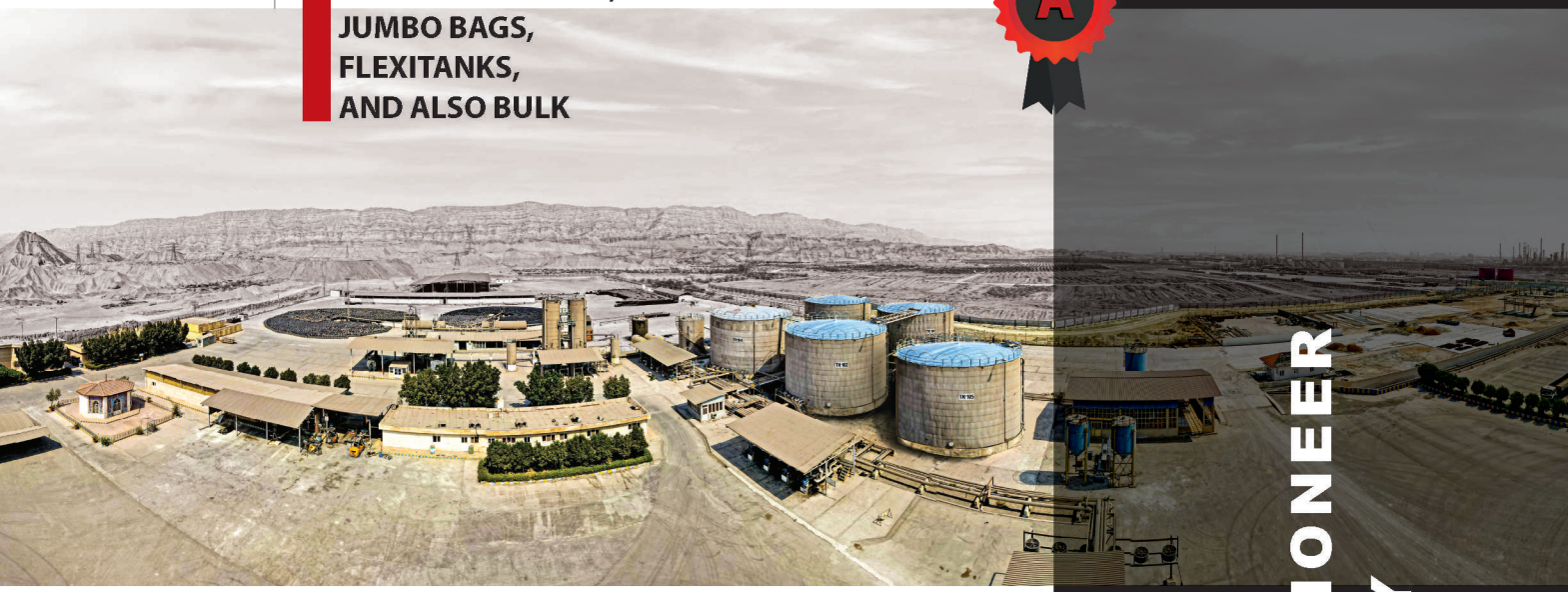

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