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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

RAIN CEMENTS LIMITED

Trigger:

- Statutory requirement: Wet drilling mandatory to prevent dust emissions
- Problem: Operators unaware of water level → accidental dry drilling → dust pollution & non-compliance
- Need: A reliable automated system to stop drilling if water is not available

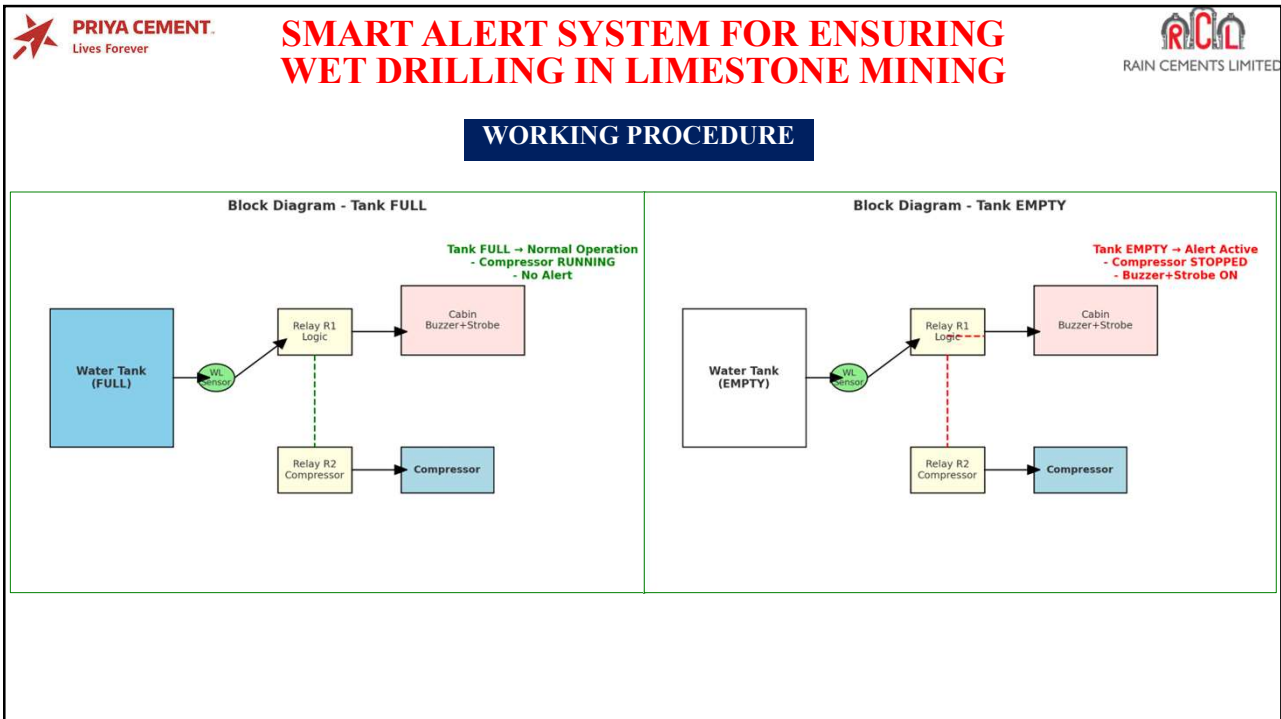
Uniqueness in Our Context:

- ❖ Designed specifically for **EPIROC IBH 10 Drill Machine**
- ❖ In house development of warning/alert system integrated with the vehicle
- ❖ Water Level Sensor → if activated → alert buzzer in combination with Strobe Light in operator cabin
- ❖ System automatically stops the drill compressor while keeping the engine running
- ❖ Prevents environmental pollution and avoids equipment failure (Instead of frequent stoppage of engine)

Timeline:

- **2023:** Conceptualized during internal review
- **2024:** Installed in EPIROC IBH 10 drill machine, trial run successful
- **2024–25:** Implemented as standard system in mining operations

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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING



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TANGIBLE BENEFITS

- ✔ **100% Wet Drilling Compliance** – Eliminates risk of accidental dry drilling
- 👤 **Safer Operations** – Ensures operators are always alerted about water availability
- 📋 **Regulatory Compliance** – Meets statutory requirements of DGMS & CPCE consistently
- Low-Cost Solution** – Simple sensor-based system, easy to install & maintain
- 📈 **Scalability** – Can be fitted to all wet drilling machines at mining area with minimal modifications

Reduced health risks/occupational hazards for the workmen involved in drilling operations



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Soil Enrichment in Industrial Green Belt Using Ghana Jeevamrutham and Drava Jeevamrutham



Trigger:

- Low sapling survival (~75–85%)
- High chemical fertilizer dependency & cost
- Need for sustainable soil health
- Using the waste generated from Goshala in sustainable way

Uniqueness:

- ❖ Adoption of traditional Jeevamrutham in an industrial green belt
- ❖ Integration of organic waste compost → manure into plantation
- ❖ Promotes circular economy & natural soil fertility
- ❖ Dedicate Cattle Care taking team including Veterinary Doctor and Helpers



Status of Cows	Male	Female
Big Cattles	22	67
Medium Heifers	21	28
Small (Calf's)	22	25
Total	65	119

Timeline:

- **2021-22:** Pilot trials started over 500 Plants
- **2023-24:** Observed Best results in Pilot Trails and extended for Full-scale implementation in 50.45 ha green belt. Stopped utilization of Artificial Fertilizer for Green Belt.
- **2024-25:** Continuing the usage of both Ghana Jeevamrutham and Dhruva Jeevamrutham for overall green belt

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Soil Enrichment in Industrial Green Belt Using Ghana Jeevamrutham and Drava Jeevamrutham



WORKING PROCEDURE

RAIN CEMENTS LIMITED, UNIT-1
Ramapuram

Standard Operating Procedure for Preparation and Application of Ghana Jeevamrutham

Objective
To prepare and apply Ghana Jeevamrutham using natural ingredients sourced from the in-house goshala to improve soil fertility and provide long-term organic nutrition to crops.

Materials Required

- Fresh Cow Dung – 100 kg
- Cow Urine – 02 liters
- Chemical-Free Soil – 2 kg
- Black Jaggery – 2 kg
- Besan (Gram Flour) Powder – 2 kg
- Water – 200 liters
- Shaded Area for preparation and fermentation

Procedure

1. Collect all the ingredients from the in-house goshala ensuring they are chemical-free.
2. In a shaded area, mix the Fresh Cow Dung, Cow Urine, Black Jaggery, Besan, and Chemical-Free Soil thoroughly.
3. Knead the mixture well to form a dough-like consistency.
4. Shape the dough into small balls for ease of handling.
5. Place the balls in a shaded area and allow them to ferment for 48 hours.
6. After fermentation, dry the balls completely under shade.
7. Once dried, the balls can be used directly or ground into powder form.

Application

- Use the dried balls or powder as an organic fertilizer for plantations.
- Apply around the root zone or mix with soil during plantation.
- Suitable for all types of crops and soil conditions.

Caution Points

- Ensure all ingredients are chemical-free to maintain organic integrity.
- Perform all mixing, fermentation, and drying processes in shaded areas to avoid microbial degradation due to sunlight.
- Avoid contamination during preparation and storage.

RAIN CEMENTS LIMITED, UNIT-1
Ramapuram

Standard Operating Procedure for Preparation and Application of Dhruva Jeevamrutham

To prepare and apply Dhruva Jeevamrutham using natural ingredients sourced from the in-house goshala to enhance soil fertility and promote plant growth.

Materials Required

- Fresh Cow Dung – 10 kg
- Cow Urine – 10 liters
- Chemical-Free Soil – 2 kg
- Black Jaggery – 2 kg
- Besan (Gram Flour) Powder – 2 kg
- Water – 200 liters
- Plastic Drum (minimum 750-liter capacity)
- Wooden Stick for stirring
- Jute Bag for covering

Procedure

1. Add all the ingredients into the plastic drum.
2. Pour 200 liters of water into the drum.
3. Stir thoroughly using a wooden stick in one direction only to ensure complete mixing.
4. Cover the drum with a jute bag to allow aeration while protecting the mixture.
5. For the next 3 days, stir the mixture twice daily (morning and evening) for 5 minutes each time.
6. Always cover the drum with the jute bag after stirring.
7. By the third day, observe the change in color indicating fermentation.

Application

- Dilute 5 liters of prepared Jeevamrutham with 200 liters of water.
- Apply the diluted solution to the plantation to promote better growth.
- Ensure the complete use of the prepared Jeevamrutham within one week of preparation.

Caution Points

- Ensure all ingredients used are chemical-free to maintain the organic integrity of the Jeevamrutham.
- Stirring should always be done in one direction to support microbial activity.
- The entire preparation and fermentation process should be carried out in a shaded area to avoid direct sunlight exposure.

GreenCo's Green Wall
Top 3 Case Studies

Rain Cements Limited, Unit - 1

Eco-Friendly Soil Health Enrichment Practices

Rain Cements Limited, Unit 1, houses a total of approximately 182 cows, including 64 males and 118 females. These cows are kept in a best-in-class cow shed equipped with ventilation fans and cleaning equipment. The milk produced is exclusively used for feeding the cows and for in-house temple rituals.

Benefits

- No chemicals are used in fertilizers.
- There is no risk of water pollution, as any runoff from plantations during heavy rainfall contains no residual chemicals before percolating into the ground.
- No risk or hazard to human health.
- No risk of soil degradation.
- Practiced as natural farming.
- Provides a rich source of nitrogen and beneficial microorganisms.
- Helps plants resist environmental stresses such as heat and rain.
- Covers the entire landscape area.

Monetary Benefit

- Promotes cow dung economy.
- No capital cost needed for equipment.
- Eliminates the cost of fertilizers.
- No health impact for users.

Monetary Benefit

- Approximately 20 kg of cow dung is used for the preparation of both solid and liquid Jeevamrutham.
- Additionally, 100 kg of cow dung is used for biogas production, with the remaining cow dung utilized for farmyard manure.
- Annually, around 3 tons of solid Jeevamrutham and 4,000 liters of liquid Jeevamrutham are produced.
- This production fully meets the fertilizer requirements for all plantations.

RAIN CEMENTS LIMITED
Mr. Dharmaraj
Assistant Manager - Irrigation Department,
Rain Cements Limited, Unit 1.

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Soil Enrichment in Industrial Green Belt Using Ghana Jeevamrutham and Drava Jeevamrutham

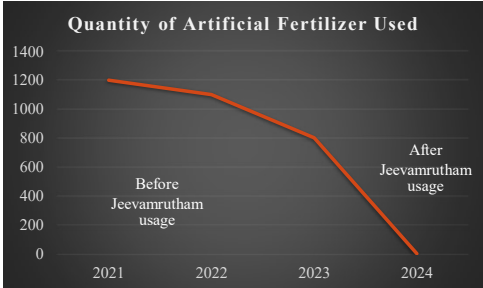


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TANGIBLE BENEFITS

-  **Higher Sapling Survival Rate** – Improved from ~70–85% to >95%
-  **Reduced Fertilizer Cost** – Chemical fertilizer usage completely stopped for Greenbelt development
-  **Organic Waste Utilization** – Waste generated from In-house goshala converted into organic liquid and solid fertilizer, applied in green belt
-  **Better Soil Moisture Retention** – Increased SOC and SOM content
- Reduced Watering Frequency** – Higher SOC and SOM content in soil
-  **Enhanced Greenery Density** – Healthier growth across 50.45 ha green belt





Year	Quantity (kg)
2021	1200
2022	1100
2023	800
2024	100

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INTANGIBLE BENEFITS



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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

-  **Operator Confidence & Safety** – Alerts reduce stress of manual checking, making operations safer
-  **Skill Upgrade** – Operators trained to use sensor-based monitoring → exposure to smart systems
-  **Environmental Responsibility** – Reinforces company's ESG commitment, even in day-to-day mining operations
-  **Positive Image** – Recognition from regulators, auditors, and visitors for proactive compliance

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

-  **Knowledge Transfer** – Traditional organic practices adapted to industry → cultural learning
-  **Minimizing Water Consumption**
-  **Sustainability Awareness** – Employees and visitors appreciate natural approach over chemicals
-  **Biodiversity Support** – Healthier soil attracts beneficial insects & pollinators
-  **Positive Image** – Recognition from auditors, visitors, and stakeholders for eco-friendly practices
-  **Statutory Requirement Compliance** – Supports CPCB/MoEF&CC green belt development guidelines through organic, sustainable maintenance

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REPLICATION WITHIN COMPANY



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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

Replicated in our other Unit.

Full-Scale Rollout – System implemented across all drilling activities in our limestone mines

Standard Practice – Incorporated into operational SOPs for drilling activities

 **Training for Operators** – All drilling staff trained in handling the alert system

Before vs After Practice – From manual water level checks → to automated sensor-based alerts

 **Integration with Future Expansion** – To be replicated in future mining projects

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

 **Full-Scale Adoption** – Expanded from pilot (~500 saplings) to entire 50.45 ha green belt

Integration with Mining Lease Area – Plan to apply Jeevamrutham & manure to green belt developed in mining area.

 **Organic Waste Linkage** – Canteen & colony waste converted to compost → directly applied to plantation

Before vs After Evidence – Visible improvement in sapling survival rate.



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REPLICATION WITHIN COMPANY



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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

 **Mining Industry** – Suitable for all types of mines (limestone, coal, iron ore, bauxite, etc.)

Construction & Infrastructure – Can be applied in piling, tunneling, and metro projects to ensure dust-free drilling

 **Other Industrial Applications** – Any operation with drilling or rock cutting can integrate the system

 **Knowledge Sharing** – Can be showcased in DGMS, IBM, CPCB, and CII forums as a best practice

 **Simple & Scalable** – Low-cost sensor solution, easy to replicate across sectors and community-level projects

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

 **Across Industries** – Can be adopted in any industry maintaining green belts (cement, steel, pharma, power, textiles, etc.)

 **Community Level** – Villages, schools, and local bodies can replicate using waste generated from Goshala → Jeevamrutham

 **Knowledge Sharing** – Model can be showcased in forums like CII, SICMA, CPCB workshops, and CSR activities

 **Scalable for Sustainability** – A low-cost, simple method that fits urban landscaping, municipal plantations, and rural afforestation drives

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CHALLENGES & SOLUTION


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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

 **Monitoring Effectiveness**
 Issue: No prior system to verify accidental dry drilling incidents
 Solution: With alert system in place, compliance is now assured 100%

 **Technical Integration**
 Issue: Adapting available components (sensor, cables, buzzer, light) to drilling setup
 Solution: In-house team carried out modifications and successful trials

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

 **Consistency in Jeevamrutham Preparation**
 Issue: Variations in preparation quality during initial trials
 Solution: Standard Operating Procedures (SOPs) prepared & training given to all the workers who are involved in the preparation of the Jeevamrutham

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BENCH MARKING


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SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

 **Statutory Norms:** DGMS & CPCB mandate wet drilling → Our system ensures 100% compliance

 **Industry Practice:** Most mines rely only on operator manual checks → occasional lapses possible

 **Our Advantage:** Sensor + alert system removes human error risk → compliance assured

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

 **National Requirement** – CPCB / MoEF&CC stipulate 33% minimum green belt; we achieved >45% of plant area

 **Organic Approach vs Sector Norms** – Most industries rely on chemical fertilizers → we shifted to organic Jeevamrutham & compost manure. Inline with the National Mission for Natural Farming strategy.

 **Resource Utilization** – Instead of external fertilizers, we recycle in-house organic waste into manure

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MAJOR LEARNINGS



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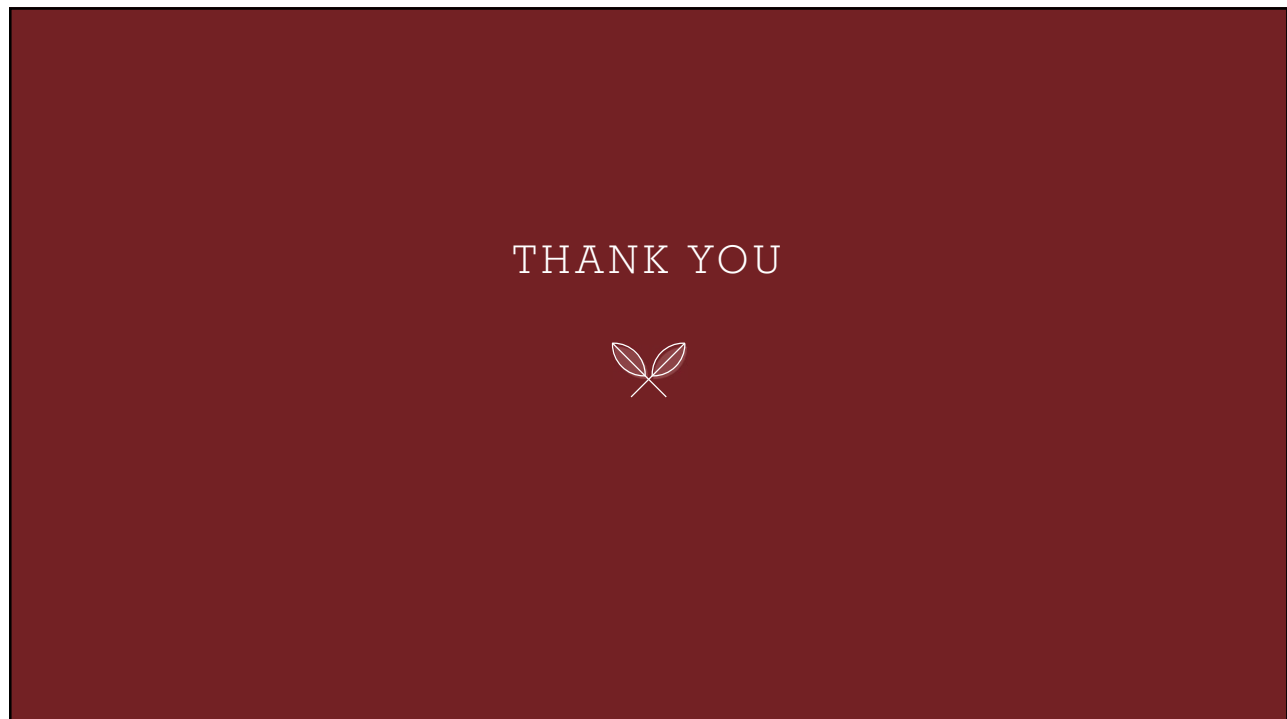
SMART ALERT SYSTEM FOR ENSURING WET DRILLING IN LIMESTONE MINING

- ✓ Even simple in-house innovations can ensure statutory compliance
- ✓ Automation reduces human error in critical operations
- ✓ Operator training is essential for successful adoption of new systems
- ✓ Preventing small lapses (like unnoticed dry drilling) avoids larger environmental and compliance risks
- ✓ Low-Cost solutions can be scaled across sectors without major investments

SOIL ENRICHMENT IN INDUSTRIAL GREEN BELT USING GHANA AND DRAVA JEEVAMRUTHAM

- ✓ Traditional organic practices can be successfully adapted in an industrial context
- ✓ Employee participation & training are critical for success
- ✓ Visible results (higher survival, cost savings) change mindsets faster than data alone
- ✓ Linking waste management with plantation creates a true circular economy model
- ✓ Low-cost, simple solutions can deliver long-term environmental sustainability

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