Egyptian Mineral Resources Authority

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Since 1962
CONSULTING GEOLOGISTS AND ENGINEERS

C E M
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EVALUATION AND BENEFICIATION OF RAW MATERIALS FOR THE CONSTRUCTION INDUSTRY

Progress Report

برنامج تحديث الصناعة
INDUSTRIAL MODERNISATION PROGRAMME

مركز تحديث الصناعة
Industrial Modernisation Centre

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Progress Report
Data Collection & Site Visits

Achievements to date:

- Have collected a significant amount of general background data.
- Qualitative data generally good. Statistical data requires adjustment to improve quality
- Site visits made to Sinai, Red Sea Coast/Eastern Desert, Nile Valley and to companies in Greater Cairo area. Visits include end users and major geo. service companies

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Site Visits

Commodity	Scheduled	Completed (Mines)	Completed (Processing Plants)
Calcium Carbonates	10	4	2
Gypsum	3	1	1
Dolomite	3	1	
Feldspars	4	6	6
Clays	5	5	7
Silica	4	3	6
Talc	2	1	6
Ornamental Stone	15	in May	?

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KEY OBSERVATIONS

Geological data for most commodities under study generally good in terms of descriptions of geological environment and major formations of interest at national/regional level, but not at site specific level.

Data lacking or poorly developed in terms of geological/operational details on specific localities/companies.

Company database is poor quality/incomplete.

Separation of responsibility for quarries and mines presents difficulties in obtaining good understanding of the overall industrial situation

Statistical data of poor quality. Requires substantial effort to validate/cross-check data

KEY OBSERVATIONS

Mineral occurrence data base system requires substantial upgrading and provision for on line access

Serious weaknesses in current mining law and mineral policy:

- **No proper cadastral system**
- **Permitting and licensing system not transparent**
- **Geological information not readily available**
- **Significant deviation from law in terms of quarry licensing procedures and limits**
- **No national mineral policy**
- **Little to no co-ordination between national authority (EMRA) and governorates**

KEY OBSERVATIONS

Poor/no knowledge of availability of assistance programs and university technical capabilities amongst companies

Little to no geological exploration/mine planning conducted by companies. Only very large companies undertake work to reasonable standards

Mining methods generally low technology.
Use of contractors widespread. Only a few contractors have good capability

Restrictions on explosives use and high cost limits mine productivity

Beneficiation generally limited to crushing/screening to size. VERY LITTLE VALUE ADDED

KEY OBSERVATIONS

Quality control/quality assurance systems lacking. Grade control by visual observation.

Domestic customers do not purchase to specification sheets and suppliers do not provide. Shipments rarely tested or if tested, approval based on performance in product after the fact.

Focus of end users, especially domestic, is solely on low first cost. End users rarely calculate true cost of low quality.

Quality control requires substantial upgrading to meet European standards

KEY OBSERVATIONS

Health and safety concerns generally lacking at mines. Only large companies enforce requirements.

Significant fugitive dust problems at many mines/processing plants handling silicate minerals (silica sand, feldspar, talc). Worker exposures are very high.

Little to no employee training at most locations

KEY OBSERVATIONS

Essentially 100% truck transport. Conflict between load limits for trucks and load limits on highways.

Significant hidden costs for transport due to police checkpoints

Low fuel costs/labour costs distort trucking costs

Night-time restrictions in S. Sinai impede efficient truck operations.

Export ports OK, but distance to major ports is cost issue.

LACK OF GEOLOGICAL PLANNING

Quarry opened without a plan. Extremely high face. Requires development of multiple benches at higher cost.

Mining Equipment

Mining equipment may be undersized for job. Drill strings stuck in rock.

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LOW TECH MINING METHODS

Example of simple ripping and dozing

LOW TECH MINING METHODS

Jack Hammer in place of blasting.

Reduced productivity per man hour

Limited availability and high cost of explosives = large muck = high cost rock breaking

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Low Tech Mining Methods

Underground mining extremely basic

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Mining Summary

- Mining equipment generally appropriate in type and size
- Some quarries using “air-track” drilling equipment that seemed too light for the task; one operation had a larger hydraulic drill rig with dust collection
- Hydraulic rock-breakers (“jackhammers”) were used for secondary (sometimes primary) breaking; these were mounted on excavators in place of a bucket
- Some quarries used Caterpillar D8 tractors, or equivalent, with rippers
- Excavators in the $1m^3$ to $1.5m^3$ range and front-end-loaders in the $3m^3$ to $4m^3$ range

Mining Summary 2

- In-pit haulage trucks, for short distances, were in the 15t to 25t capacity range
- Long road hauls use truck-trailer combinations ranging from 65t to 80t capacity
- Often saw high benches, instead of mining in 2 or 3 passes
- Tendency to overload trucks, contractors should analyze the true cost, considering maintenance costs and spillage along roads

Mining Summary 3

Consequences of small, short-term licences with fees deemed high and rising:

- not willing to engage capital in equipment as related to long-term economics
- not willing to spend on geologists, exploration and definition drilling, assaying
- no mining plan beyond current year
- low understanding of geology in the future mining area leads to poor grade control and lack of blending opportunities

Mining Summary 4

Consequences of explosives monopoly:

- shortage of explosives
- expensive blasting, cost of explosives claimed to be 3 or 4 times the world price
- narrow range of products, no emulsions with the advantage of mix variability
- no non-electric detonators or digital detonators
- capital-intensive breaking equipment to replace, or partially replace, blasting; high operating cost

Mining Summary 5

Safety and Health

- all operations claimed to have a very good safety record
- only one quarry-plant operation required hard hats, safety glasses, and orange (high visibility) vests for workers and visitors
- no operations required safety boots
- generally poor dust control – health issue plus product loss
- worker exposure to dust containing free silica will have serious consequences

SIMPLE PROCESSING

Crushing & Screening primary beneficiation method

Simple Grade Control

Hand Cobbing to control grade

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BENEFICIATION

Simple dry beneficiation main process for most commodities. Little evidence of processing/sizing/blending to produce specialized grades

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TRANSPORT

Overloaded 80t truck

Typical of industry

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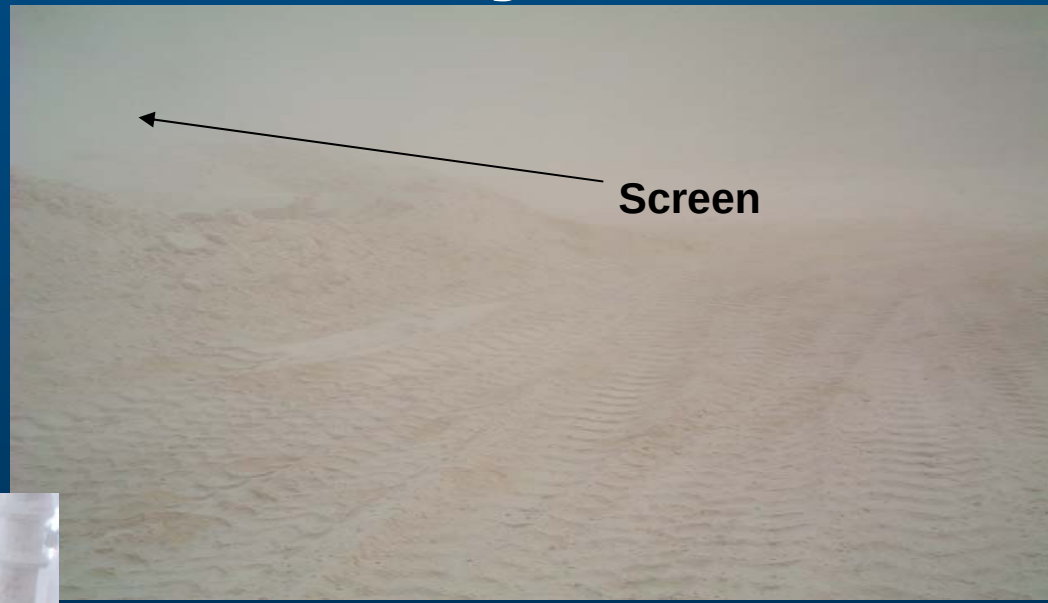
Health & Safety

Dust at Silica Sand Screening Plant



Example of poor industrial hygiene at plant:
No hard hat, no respirator,
no hearing protection,
no safety shoes, no safety glasses.
High dust levels

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Environmental Management

Significant environmental degradation due to Indiscriminate quarry licensing

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LAND USE PLANNING

Uncontrolled urbanization impacts long term planning for major projects

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Mineral Availability

Carbonates: Generally readily available. Some specific qualities for specialized applications may be in shorter supply

Gypsum: Sufficient resources available

Silica Sand: Ample supply of high quality resources

Kaolin: Moderate availability. Use of kaolinized sandstone limits quality. Small scale of operations limits supply base

Feldspars & Talc: Best quality material not readily available. Low to medium grade deposits require new beneficiation techniques to improve quality

Clays: Aswan-type clays readily available. Mining methods lead to uncertain product quality.

PRODUCT QUALITY

Feldspars generally low to medium quality

Talc low to medium quality, but some good talc

Aswan clay good, but inconsistent

Gypsum very high quality

Kaolin often contaminated with sulphates after mining. Unbeneficiated kaolinized sandstone low grade in terms of kaolin content

Silica sand for glass high quality, other silica medium quality

Limestone generally high quality

Mineral Prices

Egyptian raw materials generally low cost compared to others.

Ex-mine cost generally very low. Transport adds EGP 60-80/tonne delivered to Cairo from Aswan

Exception to low cost is good quality Na-spar only available from Army. Price fob mine much higher than comparable Turkish material, fob port

Emphasis on low cost means no quality control; significant variations in quality from lot to lot. Need to store and blend raw materials. Store horizontally, recover vertically. High inventory costs. Many consumers hold 3 months inventory.

CONCLUSIONS

- Significant differences in technology between large and small companies. Large companies internationally competitive. Small companies not competitive.
- Mining methods adapted to lack of explosives, capital, technical knowledge. Methods inhibit higher productivity from increased mechanization, better resource utilization.
- Grade control manual and inconsistent.
- Low employee skill levels in small companies. Little or no training.

CONCLUSIONS

- In general, no forward planning. Lack of understanding for geological planning inhibits effective development of resources
- Use of geological consultants for exploration, mine planning limited to large companies
- High level of contract mining means poor skills development within producing companies
- High degree of fragmentation within industry. Need for consolidation to improve financial/managerial/technical resources within companies
- Health and safety largely ignored. Large companies much better.
- Substantial upgrade in grade control, industrial hygiene, product quality will be required to compete in European market due to new regulations (REACH, etc.)

CONCLUSIONS

- New mineral policy and new mining law required. Current system is dysfunctional.

- Current system not conducive to increased investment by either domestic or foreign companies. Mining requires a long term view. Existing system encourages short term thinking.