



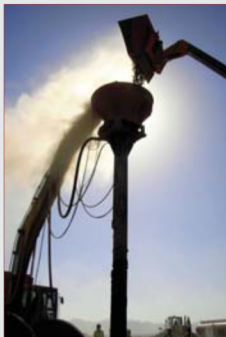
**UNSUITABLE MATERIALS**

The unsuitable materials occurring under the new runway had to be removed under dry conditions before they were replaced by dry sand of controlled gradation.



**CONSOLIDATION**

To ensure proper consolidation of bottom layers, the runway was laden by overburden materials seen being levelled by Caterpillar D8R bulldozers.



**STONE COLUMN**

The funnel that receives the crushed aggregates is being replenished.

These stones would be vibrated and pressed into the ground forming thus a stone column.

**RIGS AT WORK**

Twelve rigs worked simultaneously on the activity of forming stone columns.

Enough stock of crushed aggregates was continuously built up and replenished to ensure continuity of progress and minimal downtime.



**MUSCAT INTERNATIONAL AIRPORT. GROUND IMPROVEMENT UNDER RUNWAY**

The new runway at the new Muscat International Airport rests partially on a marshland (Sabkha).

Intensive ground improvement works had to be undertaken before the body of the runway could be constructed.

Sarooj jointly with Soletanche-Bachy of France were awarded the contract.

Basically, the weak ground was removed under dry conditions using well points and deep well techniques for dewatering.

The soil was replaced by dry sand of approved gradation. A thick layer of stones was laid on geotextile membrane provided to halt any migration of fine particles into upper layers.

One hundred thousand stone columns were driven into the ground.

Approved fill materials, stored on site were used to build the embankment.

2,000,000 T overburden of materials were loaded on the embankment to ensure consolidation and settlement of the ground.

The excavated materials were deposited on site either for removal or to be reused at a later stage.

Laboratory technicians ensured proper quality control and quality records archiving.

**GEOTEXTILE MEMBRANE**

A geotextile membrane receives a layer of crushed Gabbro stones that offer high performing and special characteristics.

The membrane stops the migration of fines into upper layers.

