

PATTERN E  
LIMESTONE COAST

FACET NO. : E<sub>1</sub>                      NAME : Rocky Foreshore  
LOCATION : West of Dwarka  
GEOREF : 41 B/16                      COMPILER : Geology Department  
DATE : April, 1977                      M.S. University  
Baroda.



### Morphology

The facet lies in the tidal zone. Surface is rough and irregular, showing a height variation upto 6 m. Areal extent upto some hundred metres along the coast. Ruggedness due to a variety of slope conditions and combination of cliffs, steeply inclined surface etc.

### Surfacial deposits

The facet being under the influence of tidal water, weathered material is washed out. Hence surfacial deposits are absent.

Water regime

Surface remains under water during high tides and moist during low tides. Devoid of external or internal drainage. Some tidal water may be retained in joints and cracks.

Associated Feature

Position in landscape : Lowest in the surrounding landscape.

Soil : Nil

Vegetation : Barren

Land use : Wasteland

Genesis : The facet is formed due to the action of water waves and tidal currents on rocky coast.

Airphoto Interpretation Aids

The facet being very small in width, cannot be clearly identified on airphotos.

Comments and Reference

The facet is present in the Toposheet Nos. 41 B/15, B/16, F/3. It is surrounded by rocky coast and Farst tidal platform, on landward and seaward sides respectively. The inclined and stepped surfaces are some times good to walk but non-trafficable for vehicles.



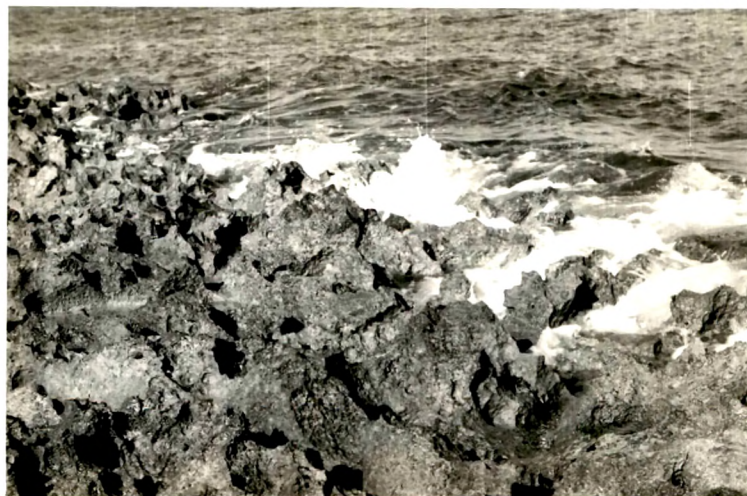
FACET NO. : E<sub>2</sub> NAME : Karst Foreshore

LOCATION : East of Bet  
Shankhodhar

GEOREF : 41 F/3

DATE : April, 1977

COMPILER : Geology Department  
M.S. University  
Baroda.



## Morphology

The facet is developed on the limestone rock and in the upper half of the foreshore. The surface is highly irregular consisting of depressions and elevations; width is about 10 to 20 m and length varies from 50 m to 1 kilometer. General slope is seaward. The surface with undulations which have sharp edges and corners.

Surfacial deposits

Being under tidal influence, surface is washed regularly during high tides. Depressions contain sand, gravels and pebbles.

Water regime

Depressions remain filled with tidal water, while elevations remain moist or dry. Devoid of external or internal drainage. Tidal water flows back through cracks and joints.

Associated Features

Position in landscape : Intermediate in the surrounding landscape.

Soil : Nil

Vegetation : Absent

Land use : Nil

Genesis : Effect of weathering and erosion by sea waves on horizontal limestones.

Airphoto Interpretation Aids

The facet appears as very light gray tone on the airphotos. The Karst nature is not recognised.

Comments and Reference

The facet is present in Toposheet Nos. 41 B/15, B/16 and F/4. The surface being highly irregular and rough, difficult to walk over, unsuitable for vehicles also.





Water regime

Though, the facet is the result of water action, it does not hold water, and only due to waves, it gets wet.

Associated Features

Position in landscape : Bottom of the cave has the same level as the surrounding landscape (i.e. tidal platform in the front).

Soil : No soil

Vegetation: No growth of vegetation.

Land use : No use

Genesis : Erosion of lower portion of a cliff by sea waves, dashing against the cliff face.

Airphoto Interpretation Aids

The facet does not show any identifying character on airphotos as its existence is concealed from above, but its presence however can be inferred along the coastal cliffs.

Comments and Reference

The facet is present in the Toposheet Nos. 41 B/15, B/16, F/3. Such facets are developed on the rocky coast where sea waves are active as erosional agents. It can provide good hiding place during low tide times.



FACET NO. : E<sub>4</sub>                      NAME : Stack  
LOCATION : West of Dwarka  
GEOREF : 41 B/16                      COMPILER : Geology Department  
DATE : March, 1977                      M.S. University  
Baroda.



### Morphology

The facet is a protruding mass of rock in the sea, isolated from the mainland. It's height may vary from 10 to 15 m from the tidal platform. Its upper portion is larger with wide convex surface, while the lower portion is narrow and constricted due to wave action which produces a notch on the sea side, the landward side being more or less vertical, (This feature is likely to be destroyed within a duration of a few years).

### Surfacial deposit

It comprises barren exposed rock with no deposition possible on the stack. The top being a somewhat flat surface may have a thin layer of residual soil on which grass is seen to grow.



Water regime

Facet remains dry throughout the year. Becomes wet during rainy season only.

Associated Features

Position in landscape : Higher than the surrounding landscape.

Soil : Thin residual soil covers the top.

Vegetation: Grass and small bushes on the top surface.

Land use : Nil

Genesis : Formed due to the wave action on coastal cliffs along planes of structural weakness.

Airphoto Interpretation Aids

The facet is present along the rocky coast, which shows light gray tone and absence of sandy beaches. Being a small feature it is seen as a small dot on air photos with the aid of magnifying lens.

Comments and Reference

The facet is present in Toposheet Nos. 41 B/16, it is a pillar or column like structure, within the sea, in the tidal zone a little away from the mainland. Inaccessible for both men and vehicles, cannot be approached by boat even.

FACET NO. : E<sub>5</sub>                      NAME : Island  
LOCATION : East of Bet  
         Shankhodhar  
GEOREF : 41 F/3                      COMPILER : Geology Department  
                                              M.S. University  
                                              Baroda.  
DATE : April, 1977



### Morphology

The facet is surrounded by water. It's height varies from a metre to 15 metres above the sea level. Surface area may be circular, oval, elongated or irregular, with areal extent varying from a few sq.m. to a few sq.km. The island may be bounded by vertical cliffs or steep slopes. Quite abundant in the offshore area of the northern coast.

### Surfacial deposits

Partly covered with surfacial deposits consisting of soil, soil mixed with rock fragments and/or mud. Mud is present on islands of low height which come under tidal influence.

### Water regime

The islands which are under tidal influence remain wet throughout the year. The higher islands become wet during monsoon, while in fair weather, remain either dry or moist. Soil holds water for sometime after rains, and this is responsible for the growth of grass and small bushes. Ephemeral channels are present on larger islands. Ground water is saline and its level fluctuates depending on the tides.

### Associated Features

Position in landscape: Higher than the water level, but almost of the same height as the mainland.

Soil : Luddy and clays of transported nature in case of low-level islands; residual, heterogeneous, in case of high level islands.

Vegetation: Mostly barren; some high level islands support a growth of grass during monsoon months.

Land use : Small area islands are wastelands, while larger area islands can be cultivated. Islands like Azad Tapu and Bet Shankhodhar are already under cultivation.

Genesis : Submergence of the coastline, leaving hills and mounds above sea water.

### Airphoto Interpretation Aids

The facet is easily recognised by its light gray tone in contrast to the dark tone of the surrounding water body.

### Comments and Reference

The facet is present in Toposheet Nos. 41 F/6, F/7, F/11, F/14, F/15, J/2. Accessibilities by small boats only.



FACET NO. : E<sub>6</sub>                      NAME : Plain Barren Land  
LOCATION : North of Mithapur  
GEOREF : 41 F/3                      COMPILER : Geology Department  
DATE : March, 1977                      M.S. University  
Baroda.



### Morphology

Occupying the extreme northern coastal region, the facet comprises coastal plain without undulations. Aerial extent varies from a sq.km. to few sq.m. Surface is devoid of vegetation, valleys, channels, hills or mounds.

### Surfacial deposit

Wind borne sand with sporadic rock fragments deposited over a rocky basement. The thickness of the surfacial deposit varies from a few cm to more than a metre.

Water regime

The facet is dry throughout the year except during the rainy season when the sands and soils hold water between intergranular spaces. Ground water is salty, the water table is near the surface only 1-2 m deep, confined to cracks and joints.

Associated Features

Position in landscape: Lower than the sand ridges.

Soil: The soil derived from the limestone, is mixed with wind borne sand, thus a mixture of residual and transported type.

Vegetation: Small flowering plants grow during monsoon.

No grass grows.

Land use : No agricultural use, barren. Could be used for locating buildings etc.

Genesis : Horizontal limestone rocks over which some wind borne material is deposited, and rendered barren by sea water during stormy weather.

Airphoto Interpretation Aids

On the airphotos, the facet shows a plain smooth surface. If wet, the tone is medium to dark gray, but when dry it shows light gray tone.

Comments and Reference

The facet is present in the Toposheet Nos. 41 E/7, E/8, E/3, E/4, E/11, J/2 etc. The surface is hard and tough hence easy for vehicular traffic, but its wet surface is a bit difficult to cross over by vehicles as it forms a shallow layer of slush.

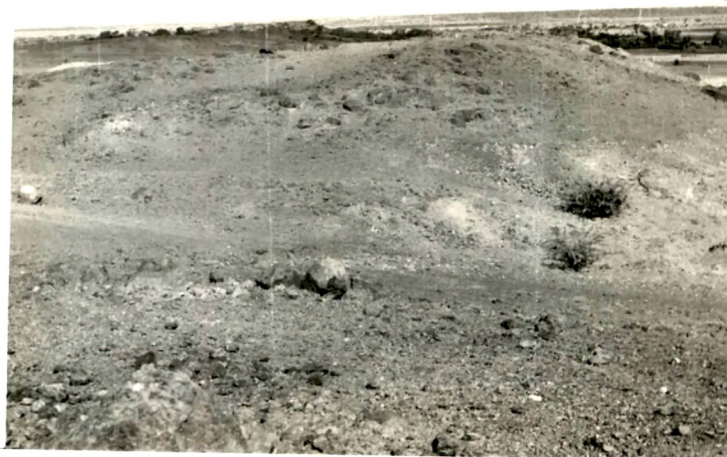


FACET NO. : E<sub>7</sub> NAME : Limestone Hill Top

LOCATION : North-West of  
Okha Machi

GEOREF : 41 F/4 COMPILER : Geology Department  
M.S. University  
Baroda.

DATE : March, 1977



## Morphology

The facet occupies highest position in the surrounding landscape; domal hill with smooth convex slopes of  $4^{\circ}$  to  $5^{\circ}$ . The top is 200-500 m wide more or less circular or oval elongated, with height about 31-32 m above MSL (about 10-15 m i.e. above the surrounding area). The slopes are soil covered and vegetated.

Surfacial deposit

The surface is covered with a 5 to 20 cm thick soil layer. The soil is coarse to ~~fine~~ grained derived from the underlying parent rocks. It is light brown in colour and is of residual type.



Water regime

The facet remains dry for most of the year. The rain water runs down the slopes after saturating the soil layer. This soil layer retains some water and keeps the facet wet for a few days after the rains, the rocky surface dries out immediately.

Associated Features

Position in landscape: Highest in the surrounding landscape.

Soil: Residual, light brown in colour, fine to coarse grained, mixed with rock pieces.

Vegetation: Growth of Cactus, Acacia arabica and grass is seen on the surface.

Land use : Soil cover supports a poor cultivation at places.

Genesis : Hills formed by a combination of structural factors (anticlinal ridge) and differential erosion due to atmospheric agencies.

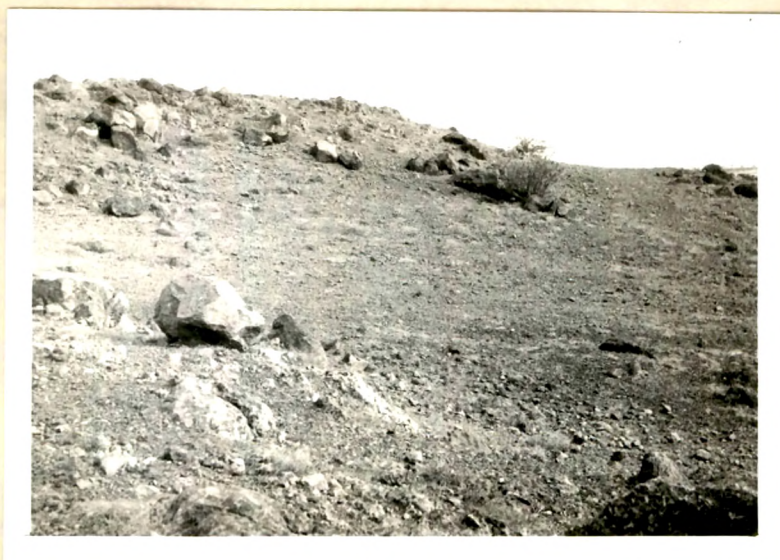
Airphoto Interpretation Aids

The facet shows medium gray tone surrounded by a dark gray tone of vegetated hill slope. The surface shows some scattered rock pieces.

Comments and Reference

The facet is present in the Toposheet Nos. 41 F/3, F/4, F/7 and F/8. It is mostly isolated, but sometimes two such hills may be connected through other facet like a small ridge, such hill tops may be irregular in shape. Generally surface is barren and can be easily walked over and trafficable by sturdy vehicles.

FACET NO. : E<sub>8</sub>                      NAME : Limestone Hill  
LOCATION : North West of              Slope  
            Okha Madhi                      COMPILER : Geology Department  
GEOREF : 41 F/4                      M.S. University  
DATE : March, 1977                      Baroda.



#### Morphology

Surrounding the previous facet, it comprises gently sloping ground with gradients  $7^{\circ}$  to  $10^{\circ}$ , occasionally more than  $40^{\circ}$ ; small gullies or channels are common, which are partly filled with sediments and show a radial drainage pattern.

#### Surfacial deposit

The surface is covered by a layer of dominantly residual soil, light brown, fine to coarse grained mixed with rock fragments. The thickness varies from 5 cm to 15 cm.

Water regime

The soils hold water for a short time after rains make them wet. For the rest of the season, it remains dry. In the ditches on slope, water may accumulate for a few days after the rain.

Associated Features

Position in landscape: Higher than the surrounding plains, but lower than the top.

Soil : Residual light brown coloured coarse to finegrained mixed with rock pieces.

Vegetation: Dense scrub with Cactus and grass.

Land use : Barren land; no use.

Genesis : Differential weathering and erosion of anticlines in the limestone.

Airphoto Interpretation Aids

Facet shows dark gray tone on account of the vegetation cover. Good surface drainage recognised. In case of circular hill top, drainage is radial. Near the bottom, big rock pieces are seen spread hapazardly.

Comments and Reference

The facet is present in the Toposheet Nos. 41 F/3, F/4, F/7, and F/8. Being dissected by drainage channels, the surface is non-trafficable, and only medium to gentle slopes are accessible on foot.