CHAPTER 206

The beach of Vinaroz. Its origin, evolution and future

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INTRODUCTION

The great physiografical unity named "Ovalo Valenciano" is outstanding in Western Mediterraneum. The Oval is limited by River Ebro, in the North, and Cape San Antonio in the South. On its Northern, margined by River Cenia, in the north, and Tombolo of Peñiscola in the South, is the subunity called Peñiscola and there stand the beach of Vinaroz, extending itself from the harbour of Vinaroz to river Cervol mouth.

COASTAL EVOLUTION

The beach lies on a steep coast, the cliff being higher all around River Cenia mounth and disappearing on the border line between Benicarló and Peñiscola districts the steep rock is composed of conglomerates made from multi-sized pebbles, cemented together in a matrix of finer materials, even clays. Sea action has given shape to a littoral where small bays, having pebbly and sandy beaches, alternate with relict debris cones (Figure, 1)

Cavanilles, giving us an extremely clear description, writes: Una descripción muy clara la encontramos en Cavanilles, quien dice: "En estas costas las olas por lo comun baten contra un terreno duro pocas veces de piedra, y muchas de un hormigón endurecido, compuesto de chinas, cantos y marga arcillosa roxa con algunas arenas. A fuerza de los choques de las olas y de renovarse la humedad, se ablanda la base que sostiene el cortezón y se descarna: presenta al principio hacia el mar excavaciones y cuevas; cayendo después al agua por su propio peso masas considerables. Mientras permanecen allí caídas, sirven de parapeto a las furias de las olas, y defienden por algún tiempo la porción con la cual estuvieron unidas; pero

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cediendo en fin quedan expuestas a igual suerte las que en otros siglos existieron sin riesgos, y de este modo va haciendo el mar lentas conquistas en la costa" (Cavanilles, 1975)

The beach of Vinaroz, born backing on the harbour breakwater, developed itself beneath a low cliff which constitutes now the foundation of the maritime promenade. It receives materials mainly from nearby sources: River Cervol, Rambla Barbiguera, River Cenia and erosive materials coming from cliffs located on River Cenia shores. River Ebro, being a further source, supplies fines to be deposited on the submerged beach; they are easily removed and conveyed southward to settle on more receptive beaches. The beach of Vinaroz has been defined as a typical gravel one because of the local character of its sources of materials and the grain size characteristics of the stuff.

SEDIMENT TRANSPORT

The medium yearly direction of the littoral dynamic is North-South, seasonally being South-North sometimes. Carriage ability moves from 170.000 m3 to 510.000 m3 per year (Serra, J., 1986), Figure, 2).

The beach of Vinaroz has enveloped in accordance with its genesis; the harbour breakwater acted partially as a barrier to conveyance and so allowed a backed up beach to be born, no longer than one kilometer but well dimensioned in with. An aggregates explotation was set beside River Cervol which cut off stuff supply towards the littoral. Even when the explotation came to an end, River Cervol is no longer a source of materials because of its few functionalism; adding to this scarce mobility of products coming from cliff's erosion and the decrease of Rivers Cenia and especially Ebro's apports, the result is a recessive shore.

Even when it only brought thin stuff River Ebro allowed the existence of a submerged beach trending to a profile of equilibrium with heterogeneous materials sand and gravels which formed a somerhour stable beach. As in the earlier paragraph has been told, the conjuction of all the afore mentioned aspects brings forth as a result a recessive beach whose characteristics are a weak accumulation by the harbour dyke (breakwater) and strong erosion in the rest of the berm sand and in the whole of the submerged beach (see figures 3 and 4).

CONCLUSIONS

Two actions trending to regenerate the beach have been undertaken in the last years: building a T-groin in the Northern end of the beach and artificial feeding.

A T-groin was built in 1985, giving birth to a sheltered beach leeward, but this came to accentuate erosion in the central stretch of the beach as

materials gravitate towards sheltered zones in the breakwater and in the harbour causing a natural selection of sediments, the coarses swelling the backed up beach and the media and fine ones going to the sheltered beach. The results of these conditions had they been maintained, would have been a sandy beach sheltered by the break water; the birth of a pebbly beach backed up to the harbour; and strong erosion in the center of the beach which would endanger the stability of the maritime promenade.

Erosion in the central stretch of the beach has been palliated since 1986 by artificial feeding but this caused two serious objetions: in the first place, since their origin was pounding, material used nailed into bathers' feet, the water getting a peculiar colour because of high contents of clays and for the same reason the beach "swallowed" bathers beside the shore. Secondly, the beach retained very few materials, due to high contents in thin ones, the rest escaping to the sheltered zone, besides off-shore loses of media and coarses stuff caused be steep slopes proper from pebbly beaches.

Several solutions can be adopted in order to regenerate the beach of Vinaroz. Among them, two are to be mentioned:

Exclusive artificial feeding; the united effect of the T-groin and artificial feeding would be satisfactory, provided that a series of permises come together. Apports should be grain-size distribution appropiate, with periodical reloading in amounts to be predetermined. Feeding with natural, not pounded, sand should be requires as we cannot hypothesice that because of surge action might get typical round shape proper from marine sediments after one year stay in the shore.

Isolated breakwaters; artificial apports can be retained by mean of isolated breakwaters, since they act as reducers of surging energy, diminishing its ability to convey and avoiding deposits gravitation towards the harbour or the T-groin, and so helping to the maintenance of apported materials. It would be not necessary that these breakwaters we propose obey to classical conceptions such as emergent or semi-emergent dykes; as a solution could by adopted that of the artificial reef, according to expres wishes of the area fishermen whom by mean of the afore mentioned system intend to protect and strengthen their fishing reservoir. This solution requires artificial feeding too, in the same qualitative conditions said in the former paragraph.

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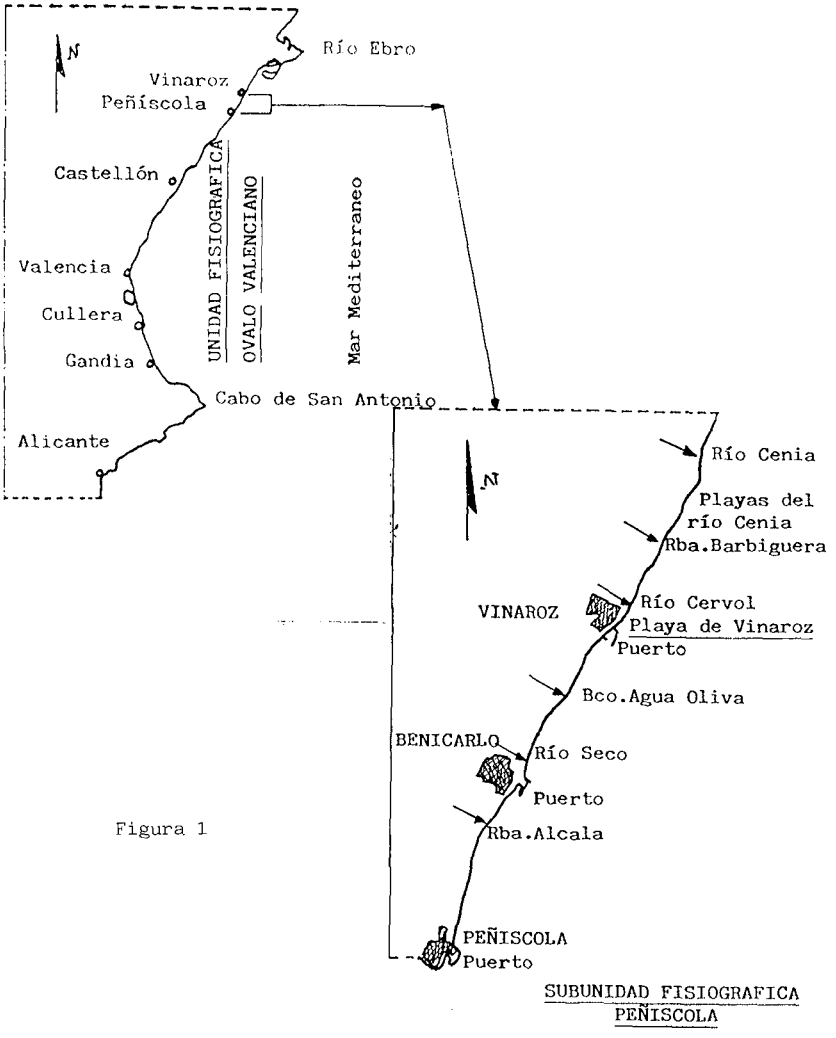

Figura 1

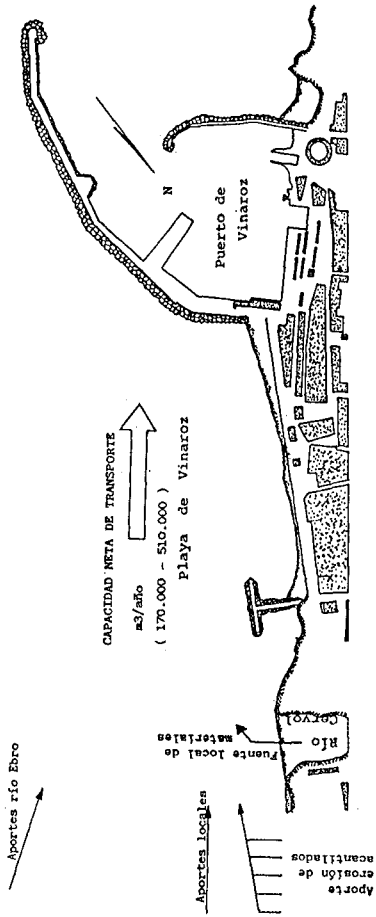
Aportes río Ebro
Aportes locales
Aporte erosión de acantilados
Río Cervol
Fuente local de materiales
CAPACIDAD META DE TRANSPORTE
m3/año
(170.000 - 510.000)
Playa de Vinaroz
Puerto de Vinaroz
N

Figura. 2

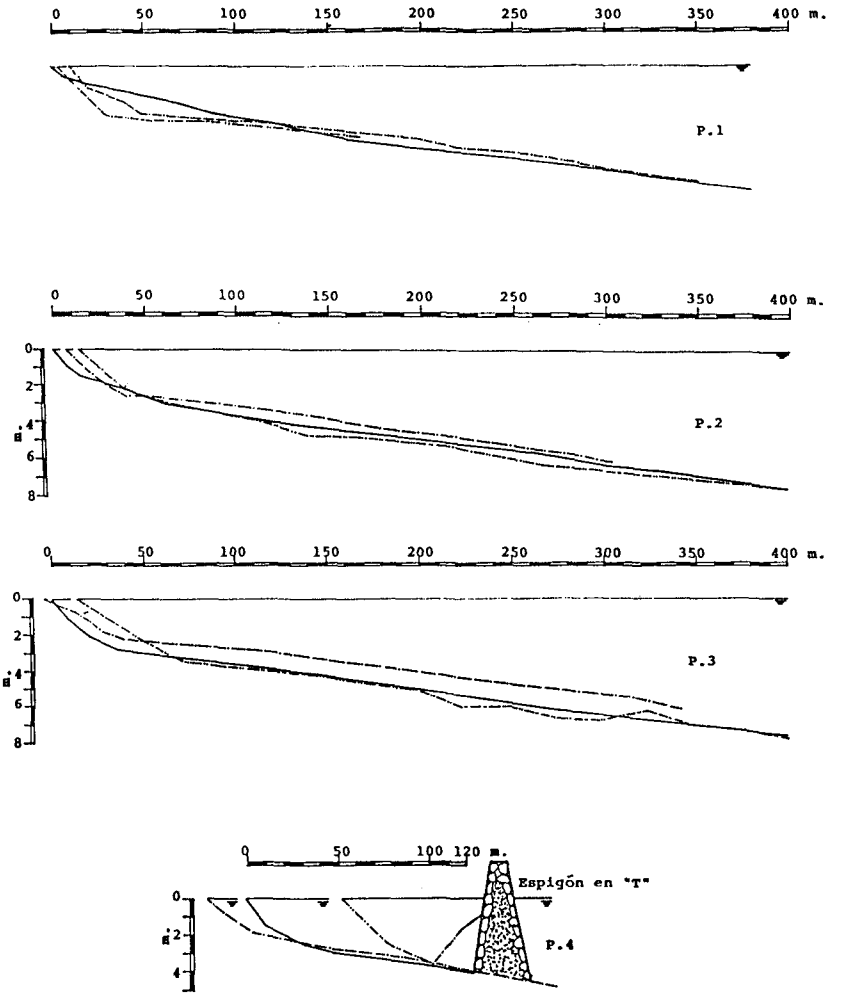
0 50 100 150 200 250 300 350 400 m.
P.1
0 50 100 150 200 250 300 350 400 m.
0 2 4 6 8
m.
P.2
0 50 100 150 200 250 300 350 400 m.
0 2 4 6 8
m.
P.3
0 50 100 120 m.
Espigón en "T"
0 2 4
m.
P.4

Figura 3

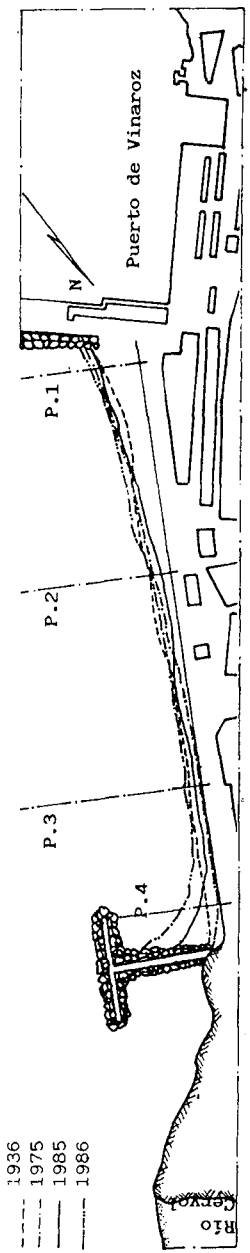

Figura 4