ACTION OF WAVES

The actions of waves are simply the activities of waves. Wave is an important agent at erosion, transportation and deposition of materials which is confined to the coast of seas, oceans and other water bodies. Waves can either be constructive (deposition) or destructive (erosion). The rate of marine erosion depends on the nature of rocks, the amount of rocks exposed to the sea, the effects of tides and currents and human interference in coast protection.

TERMS ASSOCIATED WITH WAVE

1. Wave: Wave means the turbulent movement of water as a result of wind moving on water
2. Tide: Tide is the alternate rise and fall of the surface of the sea, approximately two times a day.
3. Current: Ocean current is the movement of the surface water of the ocean in a definite direction.
4. Shore: This is the part of the land that lies between high water and low water.
5. Coast: This refers to the meeting point between the land and the sea.
6. Beach: This refers to the materials deposited on the shore by the action of waves.
7. Swash: This refers to the water thrown up the beach by breaking waves.
8. Back -swash: This is the water that sucks back and retreats after swash.
9. Undertow: This is the water which flows near the bottom away from the shore.

MECHANISM OF WAVE EROSION

1. Corrosion: This is the wearing down of cliff by wave action.
2. Attrition: This is the breaking materials like pebble, boulders, etc against cliff and against each other, as the wave continues its activities, into smaller particles.
3. Hydraulic action: In this process, fast moving waves force themselves into cracks and cavities within the base of the cliff under the pressure and enlarge the cracks.
4. Solvent action: This involves the disintegration rock materials such as limestone in
5. The coast by chemical action of the sea.

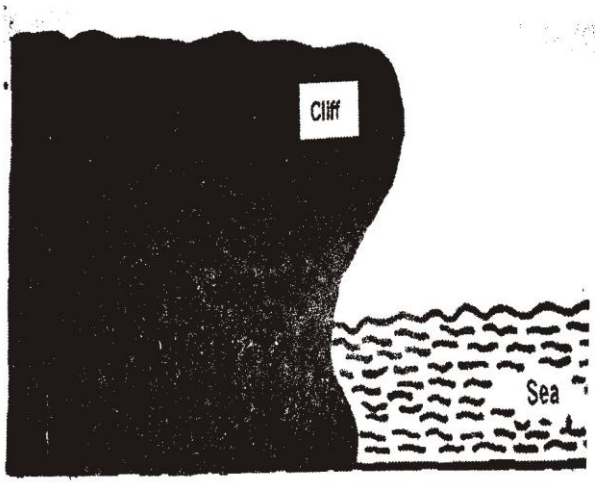
FEATURES PRODUCED BY WAVE EROSION

Capes and Bays

Characteristics: They are features of marine erosion in coastline which can be made of hard rock (cape) or soft rock (bays). A bay usually contains water and could be used as harbor.

Mode of Formation: Soft rocks along the coastline are worn away to form capes, bays, inlets or coves. The harder rocks which remains from capes, headlands or promontories. Cape and bay in other words are formed due to the action of waves on rocks of varying resistance, which causes the coast to be eroded irregular.

2. Cliffs: These are steep rock faces adjoining the coast. They are formed due to the action of waves on the base of the headland which cuts backwards as the wave action intensifies.



3. Coastal cave

Characteristics

i. A cave is a feature of marine erosion.
ii. It is an arch-shaped feature found in steep coast or cliff coast.
iii. It may contain blow-holes or geo.

Mode of formation: Coastal cave is formed by wave erosion when the softer rocks are more quickly eroded than the harder rocks. The pressure in the cave increases by the compression of the air, results in the expansion of the hollow. Further expansion of the hollow leads to the formation of a cave.

4. Arch: When two caves approach each other from either sides of a headland, they meet and unite to form an arch.
5. Stack

a) **Formation**: It is formed by wave erosion. There is presence of a head land. Wave erosion attacks headland both sides. Two caves formed on opposite side of highland. Further erosion of caves produces arch when caves join up, roof of arch collapses and seawards portion of the headland remains and is known as **stack.**
b) **Appearance**: This is a feature of the coast. Seaward part of the headland is left standing. This varies, depending on the resistance of the rock. Examples are the Needles, old man of Hoy. Further erosion of stack produces.

6. Stump: When the stack is seriously eroded to a point that a small portion is just visible above the sea-level, a stump is said to be formed.

7. Geo: Geo develop when a wave cuts into a cliff, resulting into a narrow hole called geo. It is formed when a cave collapses.
8. Gloup or Blow hole

a) **Formation:** Blow hole is formed by wave erosion on a coastal cliff. There is less resistant rock or line of weakness at the base of the cliff. Cave is produced. The spray water in the cave enlarges a vertical joint in the roof while the hydraulic action of the waves causes loose blocks to fall in while waves breaking into the cave may force water or spray or air out of the hole which is known as **blow hole.**

b) **Appearance:** It is a normal coastal feature. Joints and faults are enlarged and funnel is cut into the cliff while some caves extends some vertical pit is produced and the spray water is thrown through the pit. Examples are found on the coast of scot land.

FEATURES OF COASTAL DEPOSITION

1. Beaches: Beaches are made up of sand and gravel. They are depositional features on the coast. Beaches are formed when sand and gravel loosened from the land are moved by waves to be deposited along the shore. These deposits of sand and gravel on the shore are called **beaches**.
2. Spits: These are ridges of sand and gravels formed by long shore drift across the entrance to coastal inlet by lying on one side to the land and the other into the ocean.
3. Sand Bar:

(a) **Formation:** Sand bar starts as under water bar, formed by wave deposition in shallow sandy water. The break of the waves pushes towards the shore while the backwash and under low current drag materials round the beach and the deposition on the underwater bar builds up the bar.

b) **Appearance**: Waves open narrow channels in it. There is coastal feature and an off-shore bar. A few meters above sea level lies parallel to the shore and not continuous. At times, it is covered by water at high tide but exposed by low tide.

4. Marine dunes and dune belts: Dunes are on shore winds with large force which make a large amount of coastal sand to move land ward to form marine dunes. Marine dunes will later stretch into dune belts.

TYPES OF COASTS

Coastlines are divided into two major types;

a. Coastlines of submergence: These coastlines are formed as a result of the sinking of the land or the rise of the sea.

   Examples of such coasts are:

i. Ria coast
ii. Fiord coast
iii. Estuarine coast
iv. Dalmatian coast

b. Coastlines of Emergence: These coastlines are formed as a result of the uplift of the land or fall in the sea-level. Examples of such coasts are;

1. **Ria coasts:** Ria coast is formed when a rise in the sea level submerges or drowns the lower part of the valleys. Ria coasts are long narrow branching inlets, separated by narrow headlands. They are not glaciated but they are deep. Examples of ria coasts are found in N.W, France, NW. Spain, S.W. Ireland, Gambia to Sierra Leone coast in West Africa. Ria coast serves as a good harbor.
2. **Fiord coast:** Fiord coasts are submerged, U-shaped glaciated and shallow e.g. coasts of Norway, Alaska, British Columbia and Southern Chile.

DIFFERENCES BETWEEN RIA COAST AND FIORD COAST

i. Fiord coasts are glaciated while ria coast are not.
ii. The sides of a fiord coast are higher and steeper than those of the ria coast.
iii. The ria coast gets deeper at its seaward end whereas the deepest part of fiord is usually some distance up the fiord and not at the seaward end.
iv. Fiord coasts are deeper than ria coasts.
v. Large ocean vessels can easily reach further inland in fiord coast thine an ria coasts.

3. **Dalmatian or longitudinal coast:** This coast is formed where mountains run parallel or concordant to the coast. The submergence of the coastline produces long, narrow inlets with chains of islands parallel to the coast. They are not very good for port development. Examples are coast of Yugoslavia, western coasts of North and Southern America.

4. **Estuarine coasts:** If a lowland area sinks, the mouths of rivers are drowned just like the Rias. The drowned river mouths produced a funnel shaped structure called estuarine coasts. Estuarine coasts include: Thames, Elbe and plate which are sites of great sea ports such as London, Hamburg and Buenos.

b) Coastlines of Emergence

i. Uplift lowland coast: This is formed due to the continental shelf to produce smooth, gentle-slopping coastal lowland. The offshore water is shallow with lagoons and salty marshes, e.g. South East U.S.A, Western Finland, and Eastern Sweden.

ii. Emergence upland coast: This coastline is formed as a result of faulting and earth's movement which may raise the level of the coast. The coast is straight with steep cliffs and deeper offshore water. It has little potential for good port sites, e.g. Coast of Scotland, the Western coasts of Decca and India.

c) COASTLINE OF SUBMERGENCE

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