Province of the
EASTERN CAPE
EDUCATION

MARITIME ECONOMICS (NOTES)

GRADE 11 TERM 2: PORT STUDIES

HARBOUR OPERATIONS

SHIP ENTERING PORT:

- Well before the ship's arrival, the agent notifies Port Control of her ETA and books a berth.
- As the ship gets closer to the port, she updates her ETA.
- Voice contact is made with Port Control when about 10 hours out, and subsequent calls will keep an accurate update on her ETA.
- When about four hours out, the ship is notified by Port Control whether she will berth on arrival or will need to anchor to await entry to the port.
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- If the ship is to enter port on arrival, Port Control will contact the following for them to prepare to assist the vessel to berth :
  - Pilot
  - Pilot launch (or helicopter)
  - Tugs
  - Berthing Gang
- The pilot arrives via a launch or helicopter to assist the ship's Master to bring the ship into harbour.

- The tugs connect their towing lines and pull or push the ship as directed by the pilot to turn the ship, and to put her carefully alongside the berth.

SHIP SAILING FROM A HARBOUR:

- As soon as the ship's ETD is finalised, Port Control are informed.
- About an hour before sailing time, Port Control alert the tugs, pilot (and pilot launch or helicopter) and berthing gang.
- The pilot, tugs, and berthing gang arrive, the tugs connect their towing lines, and the ship "singles up".
- When everything is ready, the last mooring lines are let go, the tugs start pulling, turn the ship and she leaves the harbour.
- Once clear of the harbour (or earlier if agreed) the pilot disembarks via a launch or helicopter.

HARBOUR TERMINOLOGY

- ***Dock****:* An area of water that is semi-enclosed, usually by concrete, where ships can work their cargo.
- ***Terminal****:* An area of the harbour where specialised cargoes are handled (e.g. *container terminal* where containers are handled; *multi-purpose terminal* where a variety of cargoes are handled; *oil terminal* where oil is discharged or loaded; *coal terminal* where coal is handled; *iron ore terminal* where iron ore is loaded.)
- ***Wharf****:* A platform to which a ship is moored to discharge or load cargo. (*Wharf* and *Quay* mean the same thing.)
- ***Berth****:* A place in a harbour where ships can come alongside to work their cargo.
- ***To berth****:* The process of a ship coming alongside a berth in a harbour.
- ***Breakwater****:* A structure built out of concrete or rock and designed to prevent heavy swell from damaging a harbour.

- ***Jetty**:* A structure built out into the sea (or into a bay or river or into a harbour) where vessels can berth. (*Jetty* and *Pier* mean the same thing.)

HARBOUR CONSTRUCTION AND DEVELOPMENT:

Harbours are expensive!!! Prior to building, lots of research *(Council for Scientific & Industrial Research – CSIR)* is executed to check for its feasibility, among others, a cost-benefit analysis. In their research, harbour planners and port engineers need to consider a number of factors, viz. to ensure that that

- harbour construction project will be successful,
- harbour itself will be useful for a long period of time.
- All the physical factors are considered *(Risk analysis and environmental impact assessment).*

FACTORS GOVERNING THE FEASIBILITY OF HARBOUR DEVELOPMENT

1. ***The major purpose of the harbour**:*
   - Is it to be built to export and/or or import particular commodities, e.g. a mineral that is to be mined in the area?
   - Will it be to provide a safe haven for the fishing vessels and leisure craft (yachts)?
   - Will it be used mainly for container shipping?
   - What type and size of vessel (Length, Beam & Draught) will use the harbour?

2. ***The sustainability of the expected cargo volumes***

NB: Construction of a harbour amounts to an enormous expense (not limited to finance, time and effort). As a consequence, a constant flow of cargo must be assured for a long time.

If only small volumes of cargo move through the harbour it shall, in all probability, not warrant / justify such an elaborate expense.

3. ***A sheltered site for the harbour***

- ships need to work cargo in calm weather conditions, i.e. harbours need to be constructed to give as much *shelter* from the sea and swell.

- Although it may be difficult to shelter ships from wind, the *alignment of berths* may be necessary to reduce the effect of the prevailing wind.

- To ensure that the harbour is sheltered, it may be necessary to build a number of breakwaters.

- ❖ NOTE: Some harbours are built out into the sea. They are known as *Artificial Harbours*. e.g.
- Cape Town,
- Port Elizabeth,
- Ngqura (Coega) and
- Simon's Town harbours.
- ❖ Some harbours are built in a sheltered bay, lagoon or river mouth, and while short breakwaters might be necessary, the cargo wharves are built within the sheltered water area. These are known as *Natural Harbours,* e.g.
- Richards Bay,
- Durban &
- Saldanha Bay (are each built in a sheltered bay).
- East London is built on a river (Buffalo River).

4. ***Size of the area to be developed for the harbour***

- Dependant on the type and volume of cargo to be handled and the type of ship that is expected to call at the harbour.
- Mineral cargoes usually need large areas to keep the ore before loading *(this area is called the mineral stockpile).*
- Container terminals also are usually large in area *(harbours handling a smaller volume of containers will be smaller.*
- If large ships are expected to call, there must be sufficient water area to turn these large ships *(turning basin).*
- There should also be space for future expansion. Often the initial harbour plans include several stages of expansion for the harbour.

5. ***Depth of water***

- This depends on the size of ship expected to call. Deep-draughted ships will require an appropriate water depth and under keel clearance.

6. ***Flat land (large areas)***

- For cargo to be stored *(either in sheds or in open areas)* and
- rail or
- road networks.

7. ***Services, e.g. water & electricity***

- For cargo handling equipment *(cranes, mineral loaders, grain chutes, conveyor systems)*, large amounts of electricity are needed.
- All offices *(including the vital port control centre)* require electricity for their various electronic systems.
- Fresh water is also essential as ships often require tons of fresh, potable water.

8. ***Labour***

- A harbour requires workers of all levels of skills, e.g. highly qualified engineers *(to supervise complex cargo loading machinery and electronics systems)*, to lesser skilled people.
- Highly qualified and experienced seafarers are also required, e.g. Harbour masters, pilots and Vessel Traffic Services (VTS) operators.

9. ***Transport access***

- To move cargo to and from the harbour , adequate road and rail links are essential.
- Railway yards where trains are marshalled to carry the cargo to its destination are also needed, either at the harbour or close to the harbour.
- The large numbers of people employed in the harbour also need transport facilities close by.

10. ***Environmental Aspects***

- Because the harbour will take up so much space on land and in the sea, a full environmental impact assessment (EIA) must be made before final decisions are made regarding harbour construction. The EIA must be realistic and take into account all considerations. It should not be the only aspect considered when a final decision on harbour location and construction is taken.

*11****. Finance***

To build, operate and maintain a harbour costs a large amount of money.

- In some countries, the state operates all harbours and therefore the state will fund or subsidise harbour construction, e.g. TNPA *(Parastatal – A company completely, or partly, owned by a country's Government).*

12. ***Ancillary Services****:*

A harbour needs a large number of ancillary services, e.g.

- Port Control (and vessel tracking service)
- Pilotage services,
- Tug services,
- Bunkering services,
- Chandling services *(a retail dealer specializing in supplies & equipment for ships),*
- Waste disposal services,
- Ship repair and engineering services,
- Ships' agency services
- Immigration, customs & port health
- Some harbours need constant dredging (TNPA) to remove silt brought into the harbour by rivers or by tidal action. For this, some harbours have a dredger allocated. Others charter a dredger when required, or for special projects such as expanding the harbour to accommodate ships with a deeper draught / draft.

REASONS TO REJUVENATE A HARBOUR AREA

- Change in land use (e.g. fishing stores are not used as before, etc)
- Changes in technology, especially in cargo handling e.g. containerisation led to new terminals being constructed, leaving the older areas unused.
- Modern ships are too big to use original harbour wharves.
- A particular role of the harbour is discontinued, leaving sheds or other facilities unused.
- Some older harbour areas become derelict and unused, but have great potential for development.

EXERCISE:

- CALL OR WHATAPP A FRIEND AND DISCUSS THE NEED TO REJUVENATE OUR SOUTH AFRICAN HARBOURS, AND GIVE IDEAS ON WHAT CAN MAKE OUR PORTS “RELEVENT” AND YOUTH WORKER FRIENDLY!! Write this down on your exercise book.