

above water portion of the profile should be constructed at a sufficiently low elevation that the run-up and overtopping due to waves can complete and "fine-tune" the profile shaping. If the berm portion of the profile is placed too high for waves and run-up to play a role, the resulting profile will retain an artificial characteristic.

## B. POTENTIAL DREDGING IMPACTS

### Physical Effects

As described previously dredging is usually carried out to provide or remove sediment for some purpose, such as a beach nourishment project or to provide desired channel depths for improved navigation. Each of these two cases will be discussed below.

Dredging to Obtain Material - In this case the area from which the material is removed (the "borrow" area) can be fairly extensive in size and on the order of 3-6 m deeper than the ambient bottom. This anomaly can cause less damping as the waves propagate toward shore, thereby causing slightly greater breaking wave heights. Probably of greater importance than the net increase in wave energy is the modified distribution of wave energy along the shoreline due to wave refraction. The wave rays which are everywhere perpendicular to the wave crests will tend to diffuse or spread out over the deepened area thereby lessening the wave energy at some areas along the shoreline and increasing it at others. The areas of wave energy increase and decrease would depend on the wave direction as can be seen by reference to Figure 22. As there is no simple "rule of thumb" to define the effect of such a bathymetric anomaly, wave refraction studies should be carried out for each case to establish the potential impact.

For purposes of later discussion, it will be of interest to comment on the filling of the borrow depression. Although there is not a large data base relating to this matter, borrow areas are characterized by low wave energy and thus tend to fill with finer sediment than that removed. In areas where the bottom is highly mobile and where concentrations of suspended sediment are small, a greater percentage of the filling material will be from the adjacent bottom.