investigators have been interested not only in the evolution of the undulations, but in their
effects as well. The evident strength of reflection has captured the attention of coastal
scientists. In this study, one of the primary discussions will be the nature of the reflection
resulting from the existence of a periodic bottom disturbance. Two domains of reflection,
those being resonant and non-resonant reflection, have been identified by workers in the
field.

Resonant reflection may be described as a strong backscatter of wave energy due to a
tuning mechanism between the surface wave and the bottom undulations. Specifically, for
regularly spaced undulations, or bars, resonant reflection will occur when the wavelength
of the bottom undulation is half that of the surface wave, or, equivalently when twice the
wave number $k$ of the surface wave equals the wave number $\lambda$ of the bottom undulations,
\[
\frac{2k}{\lambda} = 1 
\] (1.1)
The similarity to Bragg resonant reflection in crystallography, where strong backscatter of
certain frequencies of x-rays has been used to determine the spacing between atoms in a
crystal lattice, has brought that name to the resonant backscatter of water waves. Non-
resonant reflection, while not as strong but of no less importance, can be described as
reflection away from the resonant peak.

Once the science of a phenomenon is well on its way to being worked out, the inevitable
progression is the application of the new knowledge - the task of the engineer. The development
of wave reflection technology is of interest to coastal engineers as a shore protection
measure where it may provide a means to redirect the destructive energies back offshore. It
will be shown later that it is possible to choose an artificial bar configuration such that more
undesirable frequencies may be more strongly reflected. Naciri and Mei (1988) have been
studying the possibility of using the reflective characteristics of a doubly reflective structure
on a subsiding bottom to protect the oil rigs in the Ekofisk field of the North Sea. Yoon
and Liu (1987) have suggested the use of barfields to replace harbour resonators.

The purpose of this study is not to invent specific applications of the theories introduced