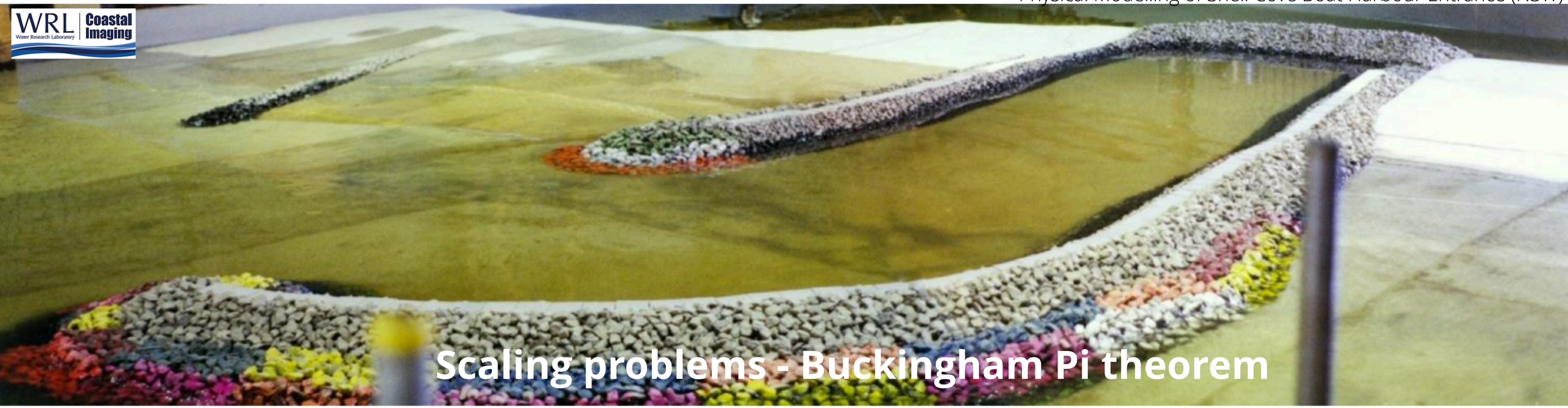
Physical modelling: laboratory models

Physical Modelling of Shell Cove Boat Harbour Entrance (NSW)



- Each of the product will have the form given by the expression:

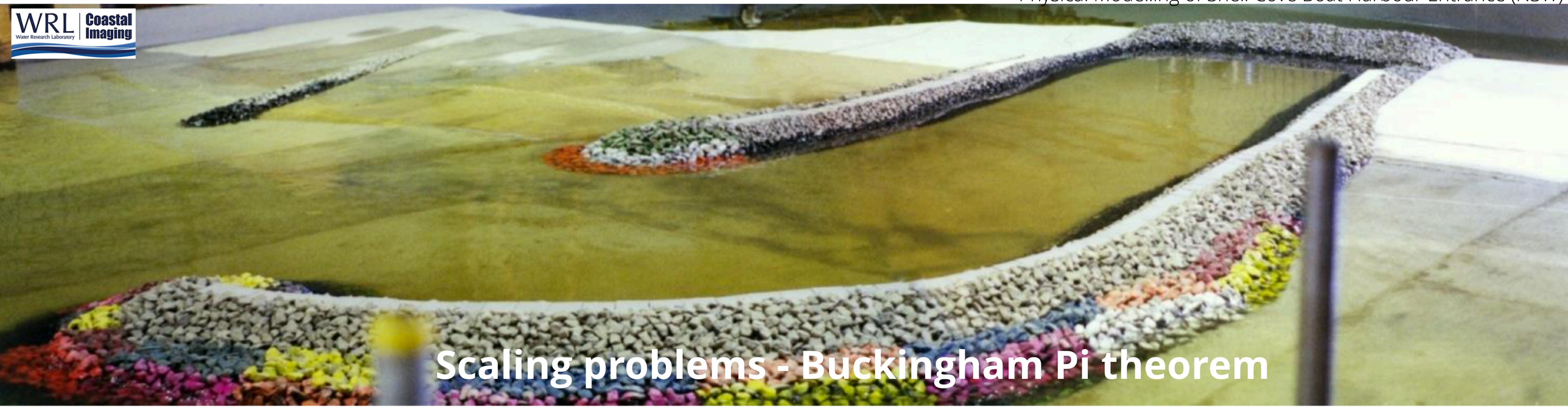
exponents to be determined

$$\pi_{1\cdots3} = V^{k1}\, L^{k2}\, F^{k3}\, \rho^{k4}\, \mu^{k5}\, g^{k6}$$

dimensionless number

Physical modelling: laboratory models

Physical Modelling of Shell Cove Boat Harbour Entrance (NSW)



Scaling problems - Buckingham Pi theorem

- Substitution of the fundamental units for each variables gives

$$\pi_{1..3} = [\ LT^{-1}\ ]^{k1}\ L^{k2}\ [\ MLT^{-2}\ ]^{k3}\ [\ ML^{-3}\ ]^{k4}\ [\ ML^{-1}T^{-1}\ ]^{k5}\ [\ LT^{-2}\ ]^{k6}$$

$$\pi_{1..3} = [\ L\ ]^{k1+k2+k3-3k4-k5+k6}\ [\ T\ ]^{-k1-2k3-k5-2k6}\ [\ M\ ]^{k3+k4+k5}$$

- Notice the coefficients of the k values correspond to the values in the dimensional matrix.