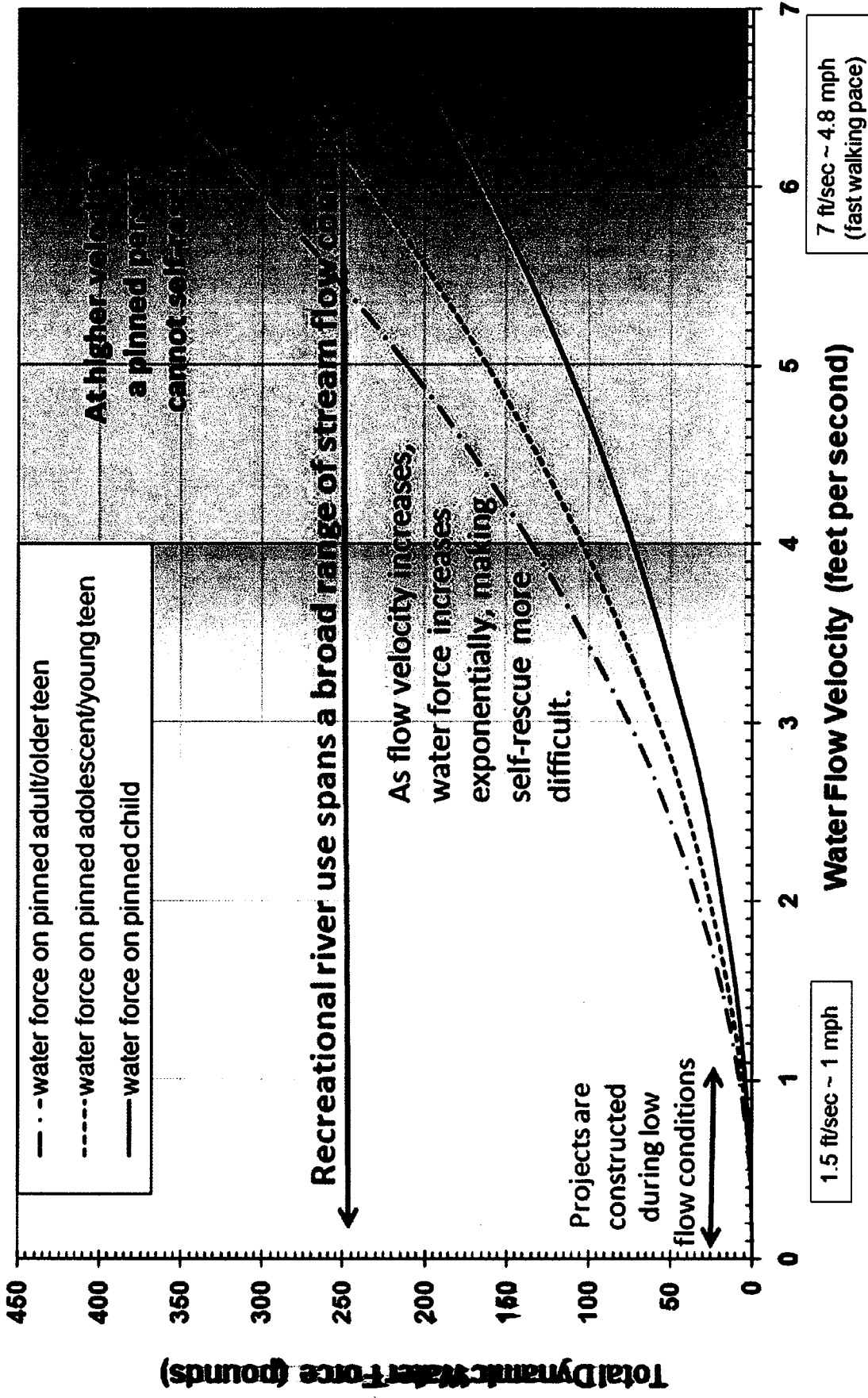


Handout @ 9/9/08 G-MNR mtg.
2008-130191

Total Dynamic Water Force on a Person Pinned with Full Frontal Area Perpendicular to the Flow



3/8/2008

7 ft/sec ~ 4.8 mph (fast walking pace)

1.5 ft/sec ~ 1 mph

These calculations, provided by the River Safety Council as illustrative of the magnitude of flow induced loads affecting pinned persons, do not replace and can not be used in lieu of licensed engineers performing appropriate calculations to assess risks associated with human designed structures placed in rivers.

Flow Load Calculations - Background

- Flow loads pinning a person against an obstruction in a river are a function of water velocity, water density, shape of the person, body position, area of the body presented to the flow, and clothing worn.
- Because there is a broad range of possible pin positions, body shapes, clothing worn, and flow conditions, there is no single solution for the range of possible pinning load on any one person.
- The calculations presented represent lightly clad persons, fully submerged, and pinned flat against a root wad or other structure.
- Data to calculate body surface areas and determine geometry characteristics necessary to calculate drag coefficients come from:
 - *Physical Characteristics of Children As Related to Death and Injury for Consumer Product Design and Use*
Highway Safety Research Institute, University of Michigan, UM-HSRI-BI-75-5, Final Report, 31 May 1975
 - *Military Handbook: Anthropometry of U.S. Military Personnel*
US Department of Defense, DOD-HDBK-743A, 13 February 1991