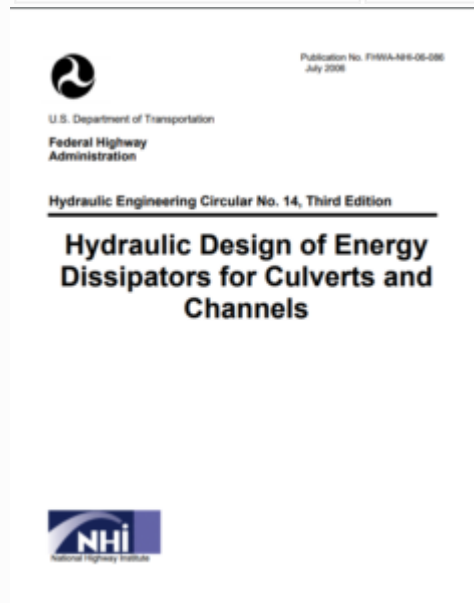


# HEC-14 Hydraulic Design of Energy Dissipators for Culverts and Channels

Author(s):	Philip L. Thompson and Roger T. Kilgore
Publisher:	FHWA
Year:	2006
Links:	PDF
Subjects:	energy dissipator, culvert, channel, erosion, outlet velocity, hydraulic jump, internal dissipator, stilling basin, impact basin, riprap basin, riprap apron, drop structure, stilling well



The purpose of this circular is to provide design information for analyzing and mitigating energy dissipation problems at culvert outlets and in open channels. The first three chapters provide general information on the overall design process (Chapter 1), erosion hazards (Chapter 2), and culvert outlet velocity and velocity modification (Chapter 3). These provide a background and framework for anticipating dissipation problems. In addition to describing the overall design process, Chapter 1 provides design examples to compare selected energy dissipators. The next three chapters provide assessment tools for considering flow transitions (Chapter 4), scour (Chapter 5), and hydraulic jumps (Chapter 6).

For situations where the tools in the first six chapters are insufficient to fully mitigate a dissipation problem, the remaining chapters address the design of six types of constructed energy dissipators. Although any classification

system for dissipators is limited, this circular uses the following breakdown: internal (integrated) dissipators (Chapter 7), stilling basins (Chapter 8), streambed level dissipators (Chapter 9), riprap basins and aprons (Chapter 10), drop structures (Chapter 11), and stilling wells (Chapter 12).

Much of the information presented has been taken from the literature and adapted, where necessary, to fit highway needs. Research results from the Turner Fairbank Highway Research Center and other facilities have also been incorporated. A survey of state practices and experience was also conducted to identify needs for this circular.