

## ENGR: 2110 “FAILURE IS ALWAYS AN OPTION” FALL 2019

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After the space shuttle *Columbia* disintegrated while reentering Earth’s atmosphere in 2003, civil engineer Henry Petroski wrote a *New York Times* essay titled “Failure is Always an Option.” He described how engineers consider failure: “[T]he way engineers achieve success in their designs is by imagining how they might fail” (2003). For this assignment, you will write about a different failure while using Petroski’s essay to help you consider ethical decision-making in engineering.

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### OVERVIEW OF REQUIREMENTS

- Individual essay for 10% of course grade
  - Two drafts (first and final)
  - 1000-1250 words
  - One figure
  - Three credible sources, including Petroski
  - APA format citations and references page
  - One 25-minute appointment with the Hanson Center
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### ASSIGNMENT GUIDELINES

In this individually written essay, you will analyze one specific structure or system and how it failed. Write a cohesive, 1000-1250-word paper about one of the subjects from the list below. If you choose another topic, you must have it pre-approved by HCTC Assistant Director Dr. Sarah Livesay.

Hartford Civic Center, 1978	Sewol Ferry, 2014
Oakland Bay Bridge, 1989	Sampoong Superstore, 1995
Autoroute 19 de la Concorde Overpass, 2006	Falls View Bridge, 1938
Sando Arch Bridge, 1939	St. Francis Dam, 1928
Oklahoma City Murrah Federal Building, 1995	Peace River Bridge, 1957
Bjork-Shiley Tilting Heart Valve, 1986	Antelope Valley Freeway, 1971 and 1994
L’Ambiance Plaza, 1987	Florida International University Bridge, 2018
Charles de Gaulle Airport, 2004	Kemper Arena, 1979
Banqiao Reservoir Dam, 1975	Schoharie Creek Bridge, 1987
Rana Plaza Building, 2013	Minneapolis I-35 Bridge, 2007
Hyatt Regency Walkway, 1981	Big Blue Crane, 1999
Morandi Bridge, 2018	Second Narrows Bridge Collapse, 1958
Delhi Dam, 2010	Mainus River Bridge, 1983
Cypress Viaduct, 1989	Colorado State Route 470 Bridge, 2004

### Your essay must do all of the following:

1. Explain for a non-engineering audience how and why the structure failed using basic statics principles from class. Incorporate research into the engineering aspects of the failure.
2. Discuss the ethical failure(s) that led to the structural collapse. Reflect on the broader ethical implications of this disaster.
3. Address this question: What responsibilities do engineers face in the design and maintenance of structures? Consider this regarding your failure and also engineered structures generally.
4. Include at least one figure (with citation and caption) that enhances your discussion.
5. Cite at least three sources: the Petroski article and two other credible sources (no Wikipedia).
6. Cite all references within the essay. Include a References page in APA format.

**Questions that will help you craft your essay include:**

- Did a design flaw involving insufficient consideration of moments, loads, and/or forces cause the structure to fail?
  - Did the structure lack redundant safety mechanisms?
  - Was the failure preventable?
  - What steps could have been taken before the structure failed?
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**REQUIRED AND RECOMMENDED READING**

- "[Failure is Always an Option](#)," Henry Petroski (*Note: You must read and cite this article.*)
  - National Society of Professional Engineers (NSPE) [Code of Ethics](#)
  - [Model essays](#) from previous Statics classes
  - [Engineering Case Studies Online](#) (*Note: Some of these subjects are not appropriate paper topics.*)
  - [Source Use and Plagiarism Policy](#) for the HCTC
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**FORMAT AND SUBMISSION REQUIREMENTS**

- Title page: Create an original title. Center and double-space. Include one line each for title, your name, course name and section, professor's name, and due date.
  - Layout: double-spaced, 12 pt. Times New Roman, 1-inch margins, page numbers
  - Length: 1000-1250 words (*Note: Both drafts must meet this length to receive full credit.*)
  - File Name: Last name, First name, Section, Draft/Final (*Example: "Smith, Jane, 000B, Draft"*)
  - Submission type: Electronic attachment, through Canvas; .doc or .docx only (no PDFs)
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**SCHEDULE AND DEADLINES**

Sept. 23	In-class visits by the Hanson Center to introduce the assignment.
<b>Oct. 16 (Wed.)</b>	<b>First Draft due to Canvas by 11:59 p.m.</b>
Week of Oct. 28	First drafts returned online.
Sept. 24-Oct. 16 OR Oct. 30-Dec. 4	Attend HCTC appointment. ( <i>Note: Because drafts will be under evaluation, appointments scheduled from Oct. 17-Oct. 29 will not count for credit.</i> )
<b>Dec. 4 (Wed.)</b>	<b>Final Paper due to Canvas by 11:59 p.m.</b>
Week of Dec. 16	Final papers returned online.

→ *Note on appointments: Bring a printed copy of 1) your paper and 2) all feedback received. You must stay the full 25 minutes for credit. You may schedule more than one appointment for your Statics essay.*

**Late Policy:** Late work will not be accepted. Rare exceptions will be made for documented illnesses or emergencies on a case-by-case basis. Further information can be found on the [Registrar's website](#).

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**The Hanson Center for Technical Communication**

**Location:** 3307 SC

**Appointments:** schedule online at <https://hanson.mywconline.com>

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