

The Blessings of Disaster

The Lessons That Catastrophes Teach Us and Why Our Future Depends on It

University at Buffalo
Department of Civil, Structural and Environmental Engineering
Licensure Engineering and Applied Sciences

Not this kind of Disaster

Buffalo Bills eliminated from playoffs with 27-10 loss to Cincinnati

Season comes to an end in lopsided loss

University at Buffalo
Department of Civil, Structural and Environmental Engineering
Licensure Engineering and Applied Sciences

Photo by Adrian Kraus/AP
Buffalo Bills quarterback Josh Allen (17) taken a hit from Cincinnati Bengals defensive end Joseph Christ (55) during the second quarter of an NFL division round football game, Sunday, Jan. 22, 2023, in Orchard Park, N.Y. The play was ruled an incomplete pass. (AP Photo/Adrian Kraus)

THE BLESSINGS of DISASTER

Lessons from past disasters are important, irrespective of causes.

Because

Our response to existential threats depends on whether we learn from, or ignore, these lessons

University at Buffalo
Department of Civil, Structural and Environmental Engineering
Licensure Engineering and Applied Sciences

University at Buffalo The State University of New York

Are we doomed?

- Without hesitation, the answer is an absolute, confident and unwavering:

It depends!

University at Buffalo The State University of New York

Three Little Pigs Story

University at Buffalo The State University of New York

University at Buffalo The State University of New York

University at Buffalo The State University of New York

Three Little Pigs Story

University at Buffalo The State University of New York

University at Buffalo The State University of New York


University at Buffalo The State University of New York

Survey:

- Which Little Pig do you wish to be?
- Which Little Pig do you wish to be, if no Big Bad Wolf ever comes?
- Which Little Pig do you wish to be, if there is a 2% chance in 50 years that the Big Bad Wolf will come?
- As such, at any point in time, depending on circumstances and timing, everybody can be any one of the Three Little Pigs, which makes preventing disasters an uphill battle
- An idea at the core of *The Blessings of Disaster*

Second Edition

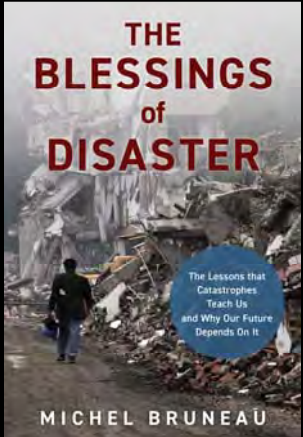
Ductile Design of STEEL STRUCTURES



Michel Bruneau Chiu-Ming Uang Rafael Sabelli

- Audience: Structural Engineers
- Length: 900 pages
- CIE 521: Chapter 1 to 7 (45 hours of lectures)
- CIE 524: Chapter 8 to 13 (45 hours of lectures)

THE BLESSINGS of DISASTER



The Lessons that Catastrophes Teach Us and Why Our Future Depends On It

MICHEL BRUNEAU

- Audience: You, your parents, your grandparents, your kids and grand-kids – and the whole neighborhood
- Length: 470 pages
- Today's presentation: 45 minutes

University at Buffalo The State University of New York

Selected “bits” from the whole story

- Willingly (or nonchalantly) exposing ourselves to hazards, “setting-up the stage” for major disasters
- Generally know where severe hazards will strike
 - It is not a matter of where; it's only a matter of when
- Can only predict future occurrences in probabilistic terms – which does not “connect” instinctively with human nature
- Silent heroes move the needle, one nudge at the time, to progressively create (over decades) a world more resilient to disasters
- Disaster puts jet engines on the needle: It opens Windows of Opportunity for immediate changes

University at Buffalo The State University of New York


Earthquake Engineering is a Journey

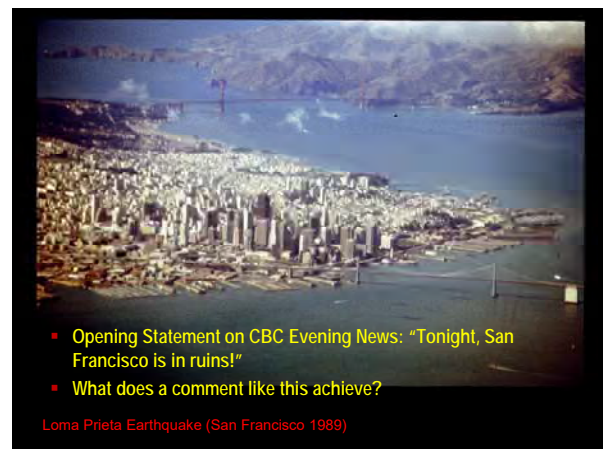
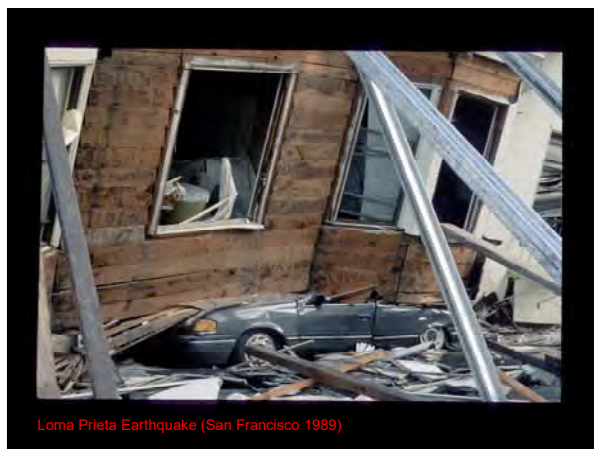
- Earthquake engineering is not only a technical matter
- Sample personal observations over career

University at Buffalo The State University of New York

Graduate Studies

- Went to California to study Structural Engineering
- Came back from California an Earthquake Engineer
- UC Berkeley Earthquake Reconnaissance Team
- Faculty Members:
 - Vitelmo Bertero
 - Steve Mahin
 - Jack Moehle
- + Graduate Students
- Earthquake = The Ultimate (uncontrolled) Experiment





University at Buffalo The State University of New York

Governor Deukmejian Reaction to EQ

- Appointed Independent Board of Inquiry to report on why so many bridges collapsed / damaged during the earthquake, and to recommend what to do with the more than 22,000 bridges in the state
- Board's final report: "The fiscal environment at Caltrans in the last two decades seems to have inhibited giving the necessary attention to seismic problems."
- Translation: After 1971 San Fernando earthquake (many bridge spans fell off their supports), Caltrans started project to tie spans to their supports
 - It took 17 years to complete at cost of \$54 million program (i.e., \$3.2 million/year, out of a state budget of ~\$50 billion/year)
 - This suggests that Caltrans' priority was not to fix bridges but to invest in roadwork to relieve traffic congestion—obviously, still a work in progress fifty years later.



Northridge Earthquake (Los Angeles 1994) - M6.7 (relatively small vs expected)

1994 Northridge Earthquake

- Most expensive U.S. natural disaster (until Hurricane Katrina in 2005)
- "The Devil is in the Details:"
 - Inadequate new engineered construction (created a "turning point")
 - Highlighted failure of pre-1980s RC construction
- Only 30% of homeowners insured; yet, residential losses (\$12.5 billion in claims) led to near collapse of insurance market in California
- 11 hospitals damaged or rendered unusable



Kobe Earthquake (Japan 1995)

Odd phenomenon: Within a few weeks after the earthquake, on week-ends, the streets of Kobe were jammed by "earthquake tourists"

Kobe Earthquake (Japan 1995)

Full disclosure (cheating): Photo here taken in 2011 on Whakaari / White Island, active stratovolcano island in New Zealand's northeastern Bay of Plenty (my photos of volcanoes in Japan include family members)

...and then in Japan, I discovered Volcanoes (could have been my 2nd career)



Erzincan Earthquake (Turkey 1992) and Izmit Earthquake (Turkey 1999)



Erzincan Earthquake (Turkey 1992) and Izmit Earthquake (Turkey 1999)

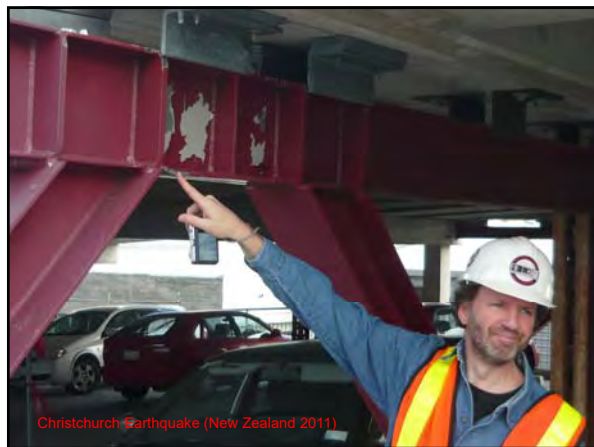
Some conclusions (among many)

- “The most important lesson with implications for practice is that (...) explicit consideration of lateral loads, together with ductile detailing, are required to ensure seismic survival and control structural damage.”
- “While this may seem obvious to many, the situation still remains that earthquake resistant design is not mandatory in many parts of the world exposed to a significant earthquake risk. Major parts of the United States, particularly east of the Rockies, could be used to illustrate this point.”
- “The complacent ignorance of the seismic threat that existed in Turkey and that resulted in the poor implementation of existing seismic codes, is not so different from that which impedes efforts to implement seismic codes on the basis of costs or other arguments in parts of the United States.”

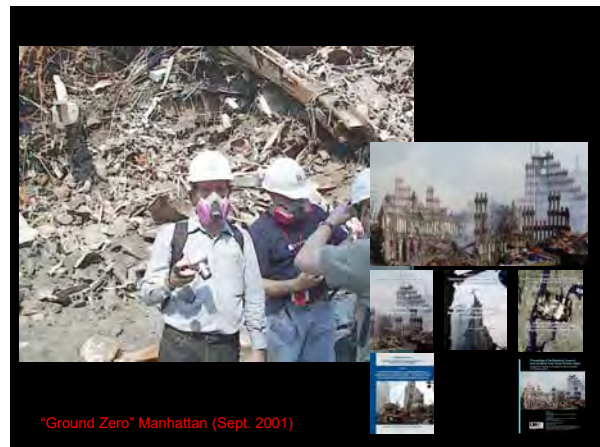
Erzincan Earthquake (Turkey 1992) and Izmit Earthquake (Turkey 1999)



Taiwan Earthquake (1999) ...a good friend advised me to chase butterflies instead of earthquakes (far less strenuous)



Christchurch Earthquake (New Zealand 2011)



"Ground Zero" Manhattan (Sept. 2001)

Hurricane Katrina Reconnaissance MCEER Reports

- Volume 4: *Damage to Commercial Buildings from Wind, Storm Surge and Debris*, by Gilberto Mosqueda and Keith Porter
- Volume 5: *Damage to Bridges from Wind, Storm Surge and Debris*, by Jerome O'Connor

“Traveling” across disasters

- Many similarities on
 - Why disasters occur (and will often continue to occur)
 - Why people care or do not care (before disaster happens)
 - Factors creating constraints/limitations to prevent disasters
- Implications across all hazards are significant
- Implications on what is ahead...
- which led to *The Blessings of Disaster*

In a nutshell, what is the book about?

- Us

OK, please expand a bit

- We are facing many existential threats
 - Climate change (always in the news) + many others
- What can we expect will happen?
- The Blessings of Disaster* proposes that how we currently deal with various hazards and the disasters they create can possibly predict how we will tackle our existential challenges
- Unfortunately, how we deal with existing hazards is not as simple as one may think – and it may be useful for everybody to know why that is the case
- A knowledgeable public is a “necessary condition” to achieve a resilient society

Structure of the Book

- Meet the Hazards
- Meet the Little Pigs
- Meet the Future

Meet the Hazards

- A world tour of the hazards:
 - Earthquakes
 - Hurricanes
 - Tsunamis
 - Volcanoes
 - Floods
 - Technological failures
 - Terrorist attacks.
- And most importantly a tour of many different creative ways by which we have exposed ourselves to the hazards

MEET (SOME OF) THE HAZARDS	
Which Little Pig Are You?	5
Earthquakes Happen Because ...	14
Earthquakes in Tsunami	30
The Water Magnet	40
Flood	59
Tornado Alley	72
Sitting on a Volcano	78
Technological Disasters	91
Terrorist Attacks	108
Annoying Domesday Scenario	119
Interlude	123

University at Buffalo The State University of New York

Meet the Little Pigs

- Disaster'R'Us (No disasters without us)
- It is our actions and inactions, unconsciously or deliberately, that create barriers against preventing future disasters.
 - Brain hard-wired in challenging ways
 - Propensity for reacting instead of being pro-active.
 - Getting stuck with a "what are the odds?" mindset
 - False Black Swan events (when convenient)
 - Blind faith (in building codes or in politicians)
 - And more

MEET THE LITTLE PIGS	
The Wonderful Ability to Forget	133
Airports: Precipitologists	148
Statistical Focus-Pocus	160
Life's Curious	184
Black Swans	195
The Brain	207
The Mirrors We Erect	223
Earthquake Damage Happens Because ...	241
Finalism: A Really Short Chapter	257

University at Buffalo The State University of New York

Meet the Future

- A glimpse of what the future might have in store, extrapolating from our approach to disasters to predict how some existential threats will play out, focusing specifically here on the joyous topics:
 - Monetary fragility
 - Climate change
 - Overpopulation
 - Nuclear holocaust
 - ... and – on the way there – putting to rest the myth that resilience will save the day

MEET THE FUTURE	
Glossary Predictions	261
The Silent Harms	271
Truth and Lies about Resilience	278
Dollars are Trapped Over Miles	281
We've All Cooked	302
Elbow Room	318
Nuclear Holocaust	331
Art V	348

University at Buffalo The State University of New York

Structure of the Book

- Meet the Hazards
- Meet the Little Pigs
- Meet the Future

University at Buffalo The State University of New York

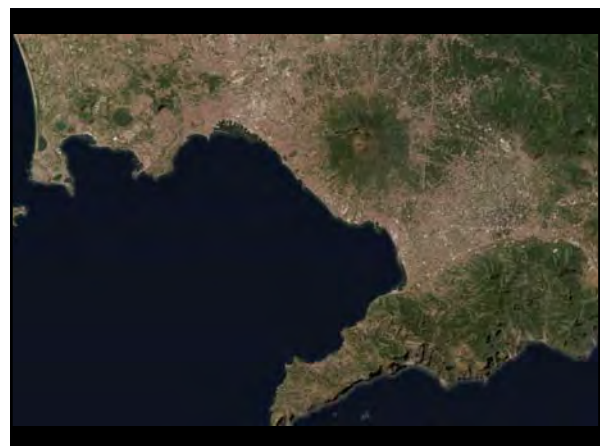
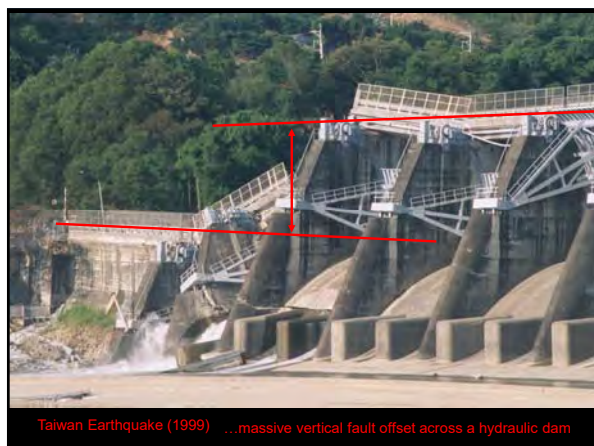
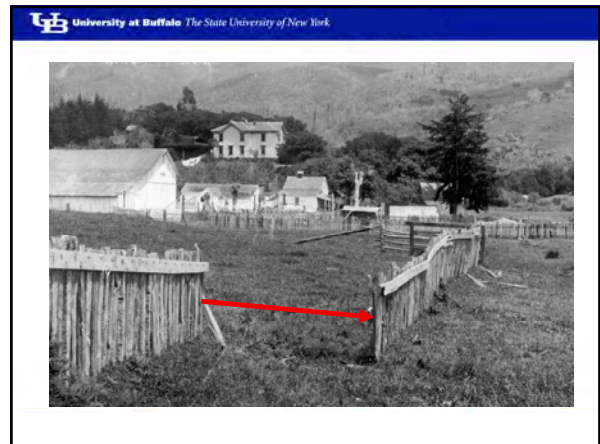
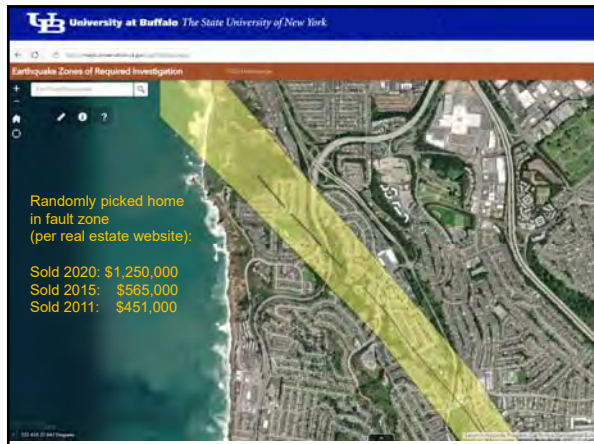
My walk from home to my campus office (U.C. Berkeley)

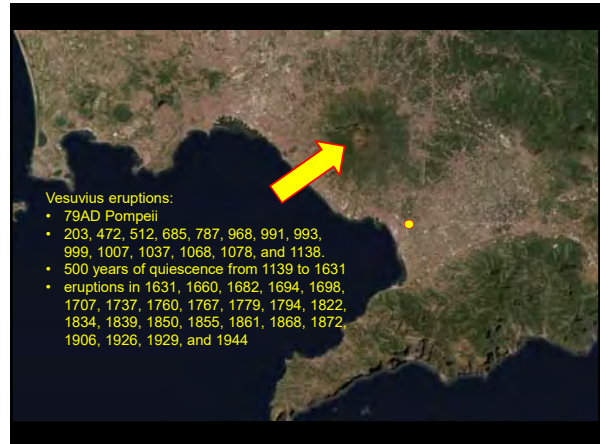
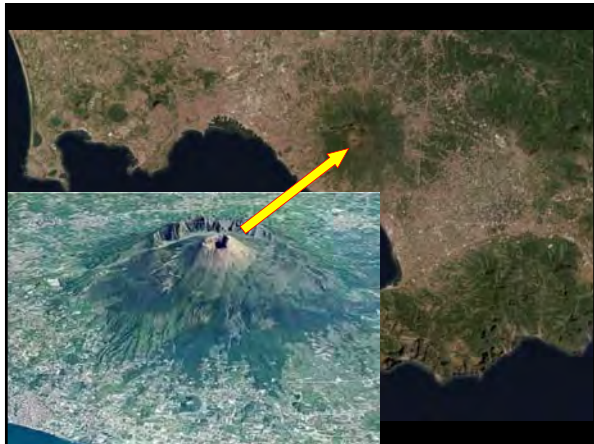
"Don't worry about earthquakes. I have lived through many of them. There's nothing to it."
 – said by a Californian definitely born *after* the 1906 San Francisco Earthquake

University at Buffalo The State University of New York

Earthquake Zones of Required Investigation

The closer to the epicenter, the more intense the shaking



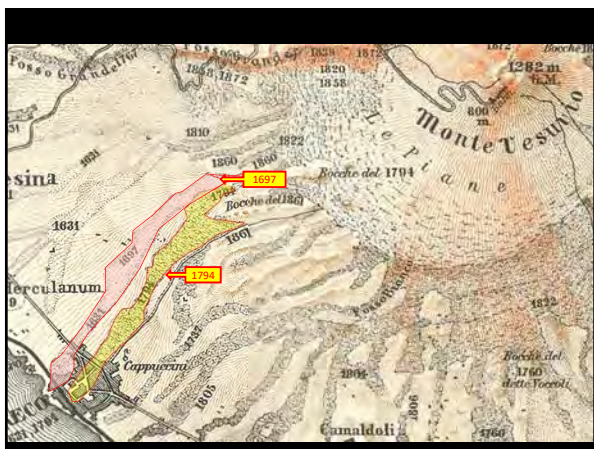
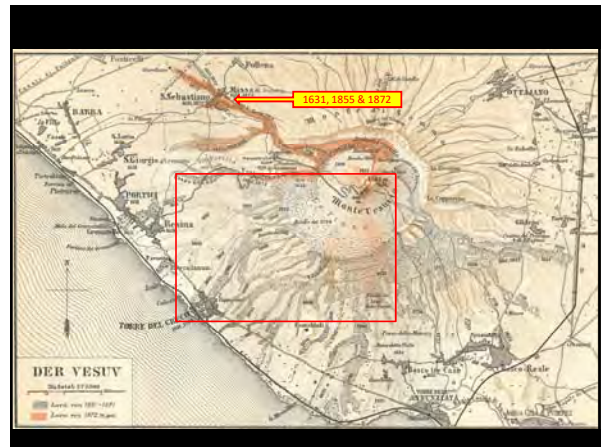
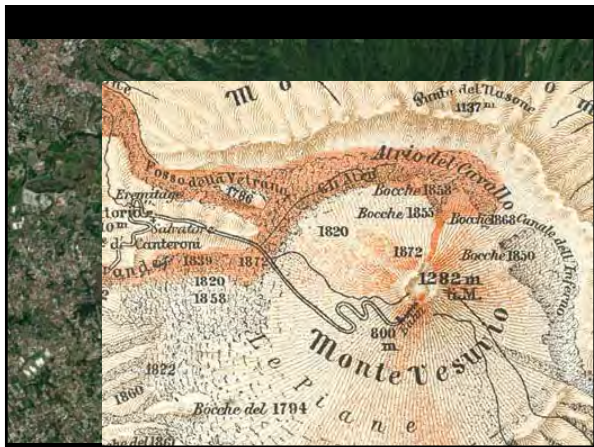


One burning candle on a dark background by Marco Verch under Creative Commons 2.0 <https://foto.wuestenigel.com/one-burning-candle-on-a-dark-background/>





Informal Survey: Would you build your home at the very end of a recent lava flows?

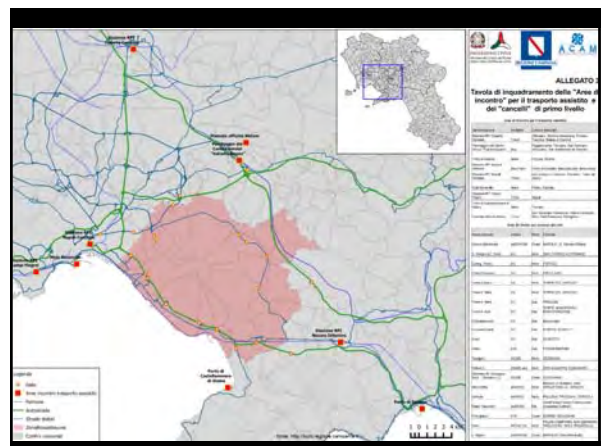




University at Buffalo The State University of New York

Volcano Hazards

- Lava
- Cinders (rocks up > 3' ejected from crater)
- Pyroclastic flow (burning hot mix of rocks, ashes, and gases rushing down at speeds 60 to 400 mph)
- Ashes
- Debris slides of earth and rocks
- Moderate earthquakes (that can in turn trigger rockslides and tsunamis)
- Toxic gases (e.g., sulfur dioxide and hydrogen sulfide)



University at Buffalo The State University of New York

Vesuvius "Red Zone"

- 600,000 people living within the "red zone" who would have to be evacuated before an eruption
- That task would take ~a week to accomplish, relying on:
 - 500 buses
 - 220 trains
 - And a truly optimistic outlook on Italian punctuality
- Success of this mass exodus also contingent upon:
 - a reliable prediction, with reasonable advance warning, of when a major eruption will occur—something that is still far from an exact science
- Of those living in the red zone:
 - 97% fully aware area is zone of high volcanic risk
 - 61% recognize volcano makes it a "hostile place to live" and that they could be displaced by future eruptions
 - Not many have take the 30,000 euros from Italian government program to abandon their home and relocate elsewhere
 - Squatters move-in where others have left

University at Buffalo The State University of New York

Structure of the Book

- Meet the Hazards
- Meet the Little Pigs
- Meet the Future

University at Buffalo The State University of New York

Earthquakes are (by themselves) Harmless



No Harm to someone sitting in a lawn chair in the middle of an open field

University at Buffalo The State University of New York

Meet the Little Pigs

- Disaster'R'Us (No disasters without us)
- It is our actions and inactions, unconsciously or deliberately, that create barriers against preventing future disasters.
 - Brain hard-wired in challenging ways
 - Propensity for reacting instead of being pro-active.
 - Getting stuck with a "what are the odds?" mindset
 - False Black Swan events (when convenient)
 - Blind faith (in building codes or in politicians)
 - And more

MEET THE LITTLE PIGS	
The Wonderful Ability to Forget	133
Airport Psychologists	148
Statistical Hocus-Focus	160
Life's Casino	184
Black Swans	195
The Brain	207
The Mirrors We Elect	223
Fart	241
Fate	257

University at Buffalo The State University of New York

Meet the Little Pigs

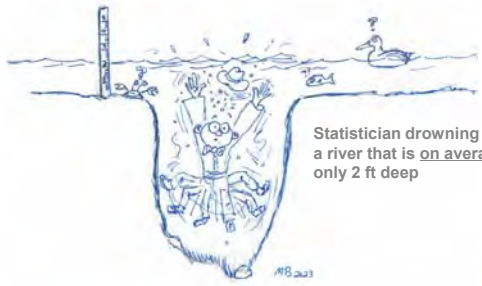
- Disaster'R'Us (No disasters without us)
- It is our actions and inactions, unconsciously or deliberately, that create barriers against preventing future disasters.
 - Brain hard-wired in challenging ways
 - Propensity for reacting instead of being pro-active.
 - Getting stuck with a "what are the odds?" mindset
 - False Black Swan events (when convenient)
 - Blind faith (in building codes or in politicians)
 - And more

MEET THE LITTLE PIGS	
The Wonderful Ability to Forget	133
Airport Psychologists	148
Statistical Hocus-Focus	160
Life's Casino	184
Black Swans	195
The Brain	207
The Mirrors We Elect	223
Earthquake Damage Happens Because ...	241
Fartions: A Really Short Chapter	257

University at Buffalo The State University of New York

Extreme Events → Tail Risks (not Average Risks)

(Low-Probability High-Consequence Events)




Statistician drowning in a river that is on average only 2 ft deep

Q: How do we deal with risks and probabilities? A: Instinctively, not well.

University at Buffalo The State University of New York

The Probability Game

- A group of 160 gynecologists was asked how many women who test positive from the results of a routine mammography actually truly have breast cancer, if:
 - 1 percent of all woman have breast cancer;
 - 90 percent of the women with breast cancer test positive, and;
 - 9 percent of the woman who do not have breast cancer, receive a false positive, like a false alarm.
- Multiple Choice Answers:
 - A) 81%
 - B) 90%
 - C) 9%
 - D) 1%



University at Buffalo The State University of New York

The Probability Game

- A group of 160 gynecologists was asked how many women who test positive from the results of a routine mammography actually truly have breast cancer, if:
 - 1 percent of all woman have breast cancer;
 - 90 percent of the women with breast cancer test positive, and;
 - 9 percent of the woman who do not have breast cancer, receive a false positive, like a false alarm.
- Multiple Choice Answers:
 - A) 81%
 - B) 90%
 - C) 9%
 - D) 1%

Correct answer ←

1000 Women Tested

- 99% (990) No Cancer
- 1% (10) Have Cancer

91% (901) True Negative	9% (89) False Positive	10% (1) False Negative	90% (9) True Positive
-------------------------	------------------------	------------------------	-----------------------

Number of True Positive = $\frac{9}{9+89} = \frac{9}{98} \approx 9\%$

University at Buffalo The State University of New York

The Probability Game

- A group of 160 gynecologists was asked how many women who test positive from the results of a routine mammography actually truly have breast cancer, if:
 - 1 percent of all woman have breast cancer;
 - 90 percent of the women with breast cancer test positive, and;
 - 9 percent of the woman who do not have breast cancer, receive a false positive, like a false alarm.
- Multiple Choice Answers:
 - A) 81%
 - B) 90%
 - C) 9%
 - D) 1%

Correct answer ←

- 21 percent of the gynecologists (who typically have more than twenty years of schooling) picked the right answer.
- Kindergarten kids picking answers randomly would have a 25% chance of picking the right answer.

University at Buffalo The State University of New York

The Probability Game

- If you have the choice of building two absolutely identical houses, for the exact same cost, at the exact same location, which of the following two would you prefer to build?
- Choices:
 - A) A house that is designed to resist earthquakes, except that over a period of 50 years, there is a 2% chance than an earthquake bigger what has been considered in its design will occur.
 - B) A house that is designed to resist earthquakes, except that an earthquake larger than what has been considered in its design will occur on average once every 2500 years.
- Answer: It makes no difference – these are two different ways to express the exact same probability of exceedance.


University at Buffalo The State University of New York

Denial of Risk

- In 1990, someone told me: “You are trying to sell something nobody cares about”
- In 2022, during opening ceremony of the 12th National Conference on Earthquake Engineering, Salt Lake City, the Governor of Utah said: “Nobody cares about the work you do, until an earthquake happens, and then they do care.”
- It is true for any hazard:
 - Resilience of the Engineered Infrastructure is Something Many Don't Care About until After the Disaster

University at Buffalo The State University of New York

Denial of Risk and Optimistic Outlook



University at Buffalo The State University of New York

Denial of Risk and Optimistic Outlook




Tracking the paths
A look at all of the major hurricanes (category 3 and higher) that have passed through Florida since 1951.

Year	Name	Year	Name	Year	Name
1951	Opal	1962	Quentin	1973	Carlotta
1952	Edith	1963	Estelle	1974	Edith
1953	Carol	1964	Josephine	1975	Edith
1954	Opal	1965	Opal	1976	Opal
1955	Opal	1966	Opal	1977	Opal
1956	Opal	1967	Opal	1978	Opal
1957	Opal	1968	Opal	1979	Opal
1958	Opal	1969	Opal	1980	Opal
1959	Opal	1970	Opal	1981	Opal
1960	Opal	1971	Opal	1982	Opal
1961	Opal	1972	Opal	1983	Opal
1962	Opal	1973	Opal	1984	Opal
1963	Opal	1974	Opal	1985	Opal
1964	Opal	1975	Opal	1986	Opal
1965	Opal	1976	Opal	1987	Opal
1966	Opal	1977	Opal	1988	Opal
1967	Opal	1978	Opal	1989	Opal
1968	Opal	1979	Opal	1990	Opal
1969	Opal	1980	Opal	1991	Opal
1970	Opal	1981	Opal	1992	Opal
1971	Opal	1982	Opal	1993	Opal
1972	Opal	1983	Opal	1994	Opal
1973	Opal	1984	Opal	1995	Opal
1974	Opal	1985	Opal	1996	Opal
1975	Opal	1986	Opal	1997	Opal
1976	Opal	1987	Opal	1998	Opal
1977	Opal	1988	Opal	1999	Opal
1978	Opal	1989	Opal	2000	Opal
1979	Opal	1990	Opal	2001	Opal
1980	Opal	1991	Opal	2002	Opal
1981	Opal	1992	Opal	2003	Opal
1982	Opal	1993	Opal	2004	Opal
1983	Opal	1994	Opal	2005	Opal
1984	Opal	1995	Opal	2006	Opal
1985	Opal	1996	Opal	2007	Opal
1986	Opal	1997	Opal	2008	Opal
1987	Opal	1998	Opal	2009	Opal
1988	Opal	1999	Opal	2010	Opal
1989	Opal	2000	Opal	2011	Opal
1990	Opal	2001	Opal	2012	Opal
1991	Opal	2002	Opal	2013	Opal
1992	Opal	2003	Opal	2014	Opal
1993	Opal	2004	Opal	2015	Opal
1994	Opal	2005	Opal	2016	Opal
1995	Opal	2006	Opal	2017	Opal
1996	Opal	2007	Opal	2018	Opal
1997	Opal	2008	Opal	2019	Opal
1998	Opal	2009	Opal	2020	Opal
1999	Opal	2010	Opal	2021	Opal
2000	Opal	2011	Opal	2022	Opal
2001	Opal	2012	Opal	2023	Opal

University at Buffalo The State University of New York

What is wrong with this picture?

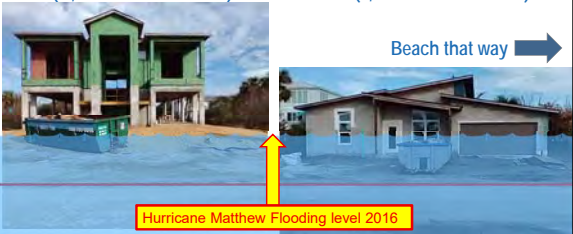
- Two Florida homes being built at the same time (2023) on the same street having constant base flood elevation of 6' (2,464' from the beach) (1,660' from the beach)



University at Buffalo The State University of New York

What is wrong with this picture?

- Two Florida homes being built at the same time (2023) on the same street having constant base flood elevation of 6' (2,464' from the beach) (1,660' from the beach)

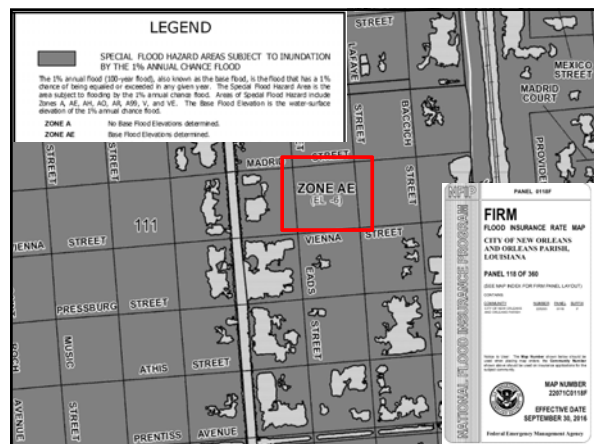
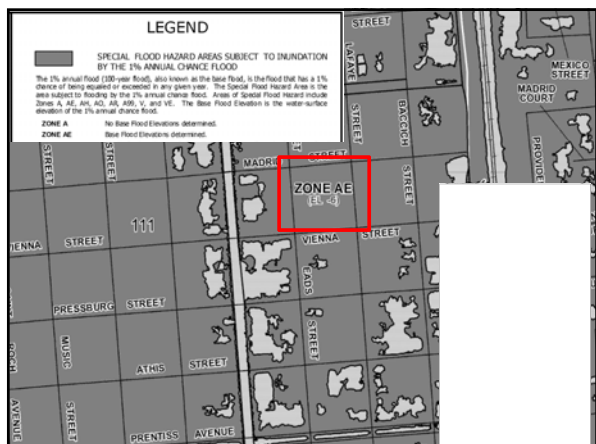


Hurricane Matthew Flooding level 2016

University at Buffalo The State University of New York

Quiz (trick question)

- How much water in the living room of a house built at a BFE of -6 ft every 100 years?
- Hint: This location is not in Florida

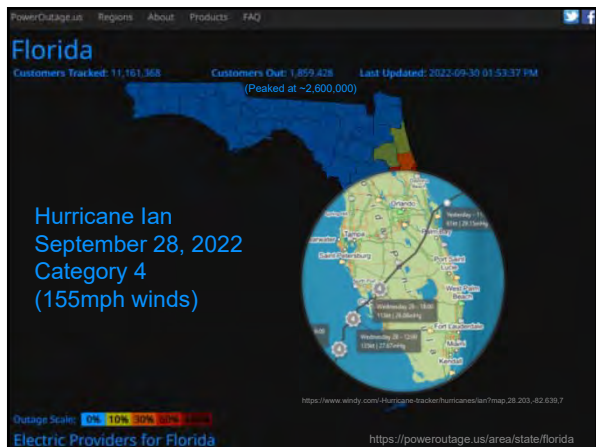




University at Buffalo The State University of New York

Quiz (trick question)

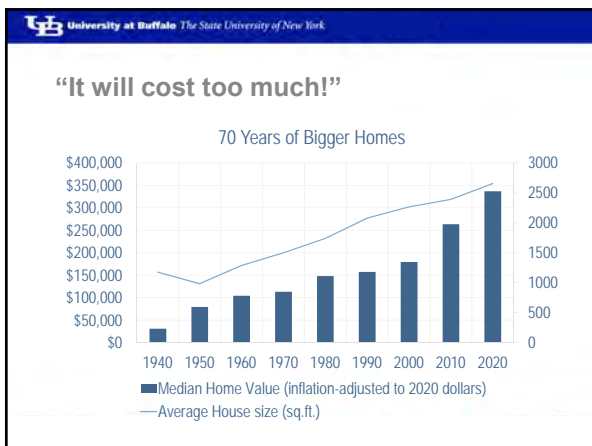
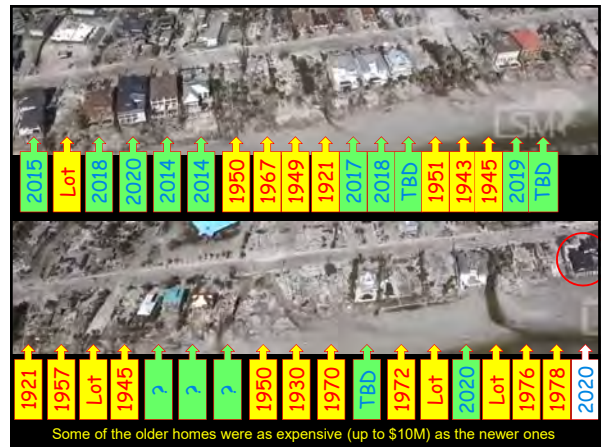
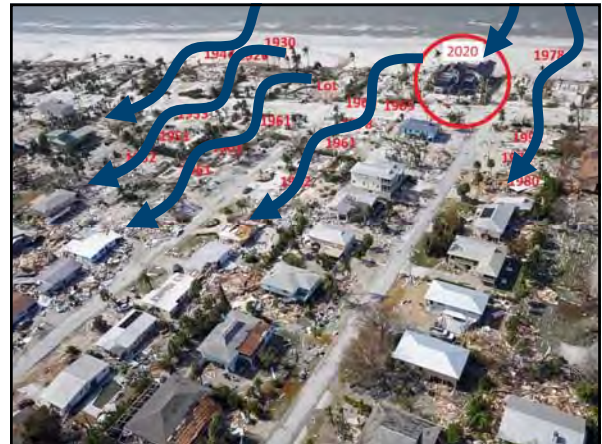
- How much water in the living room of a house built at a BFE of -6 ft every 100 years?
- Answer is: 6 feet plus amount by which levees are overtopped
 - Post-Katrina: \$14 billion for US Army Corps of Engineers to strengthen levees and walls that surrounded New Orleans, to provide protection against a 100-year flood—i.e., leaving a 1 percent chance each year that all that work will not be sufficient to prevent flooding.
 - After project completion in 2018, a year later, US Army Corps predicted that, as a result of subsidence and sea-level rise, level of protection provided by this \$14 billion investment would actually fall below the 100-year flood level by **2023**



University at Buffalo The State University of New York

LinkedIn Post: (Day after Hurricane Ian) "The house I want to know more about"

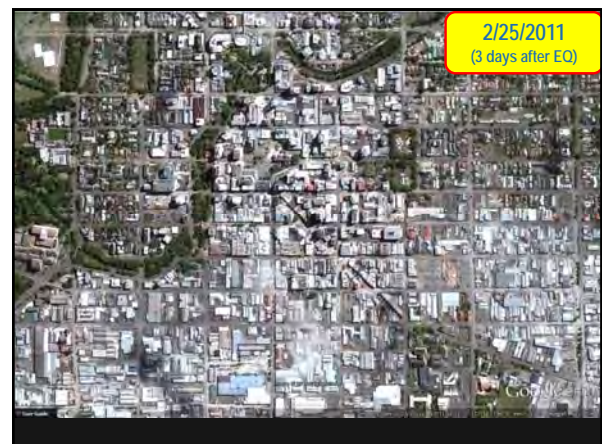
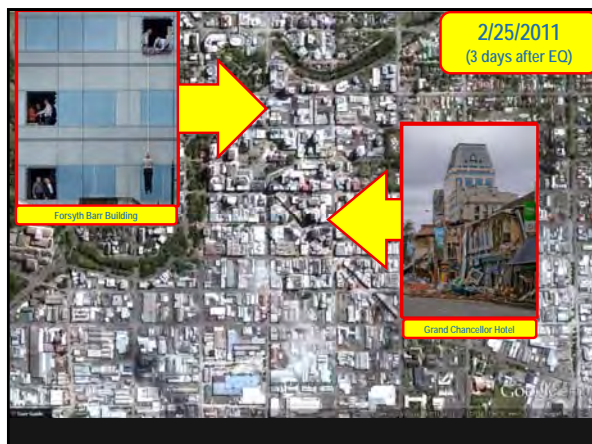
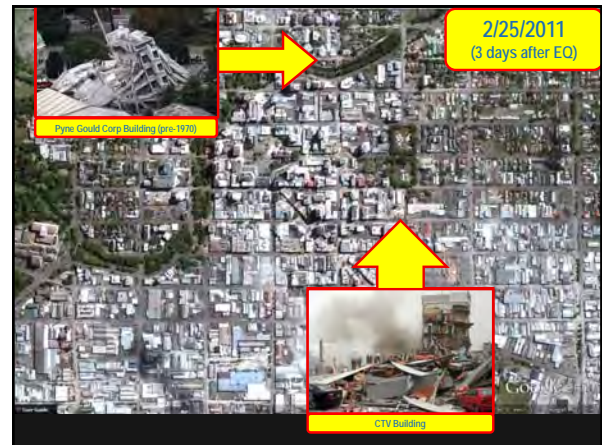
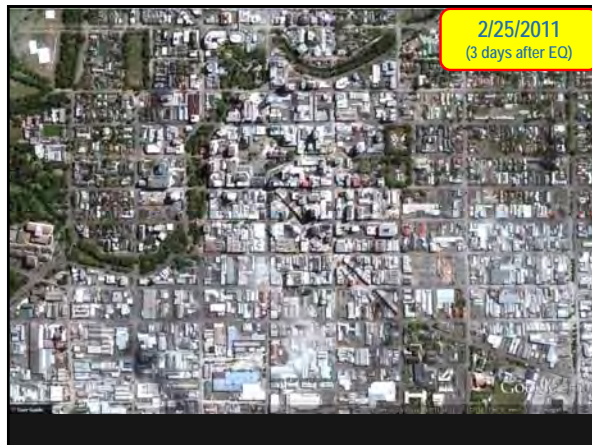
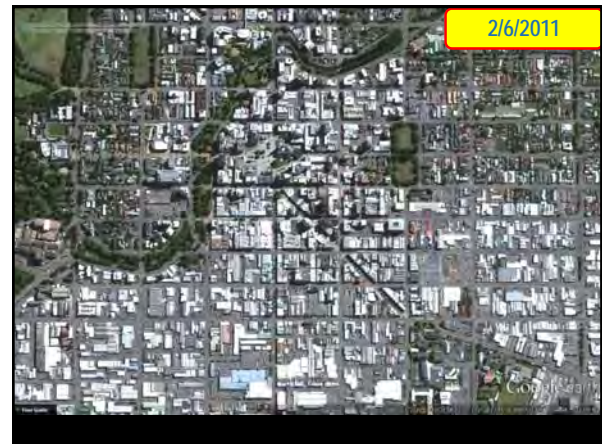
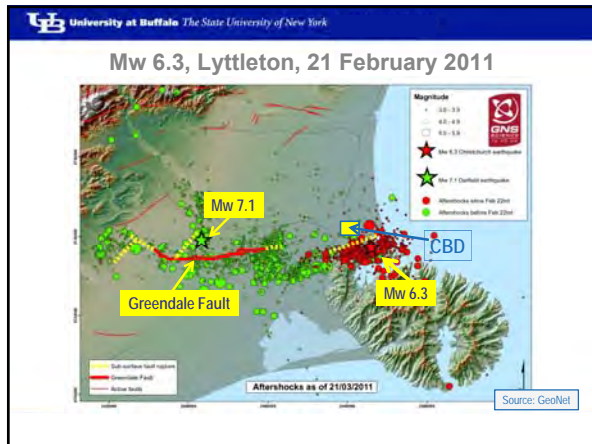
- 5 Days later
 - 1,000,000+ impressions, 7000+ Likes, and ~500 comments
- Comments
 - Most common response from engineers and contractors:
 - Good design and attention to structural/technical details, break-away walls, types of material, floor above Base Flood Elevation (BFE)
 - Latest Florida Buildings Code Provisions (roof ties, wind speed, etc.)
 - Most common response from non-engineers:
 - Luck
 - God / angels / divine protection / whims of mother nature
 - Houses only the very rich could afford
 - Older homes were better build, so more likely to survive

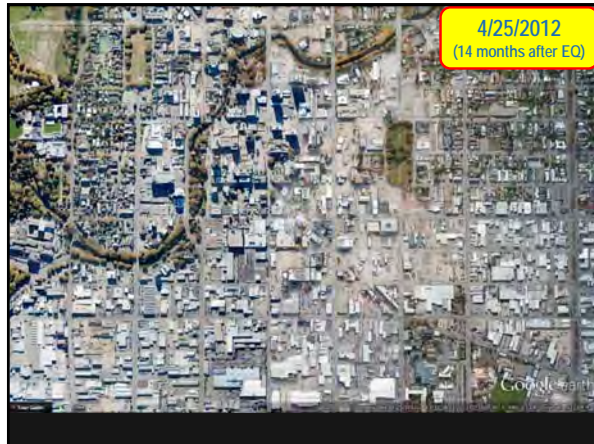


University at Buffalo The State University of New York

Building codes will help?

- Yes, but
- First, building codes must exist
 - Some cities and some states have been keen in adopting building codes
 - Some have ferociously resisted doing so, in the name of freedom—for lack of a better term
- Second, purpose of buildings code is not always what people think it is






University at Buffalo The State University of New York

The Pay-now or Pay-later Decision

It is a rational decision to bet against occurrence of an extreme event to use liquidity for other purposes, provided it is a conscientious decision, recognizing all consequences, and using insurance (or self-insurance) to cover the risk



A NHTSA crash test
What most owners are typically sold



What some owner typically think they are getting (but wouldn't pay for)

University at Buffalo The State University of New York

Outcome of Current Design Approach



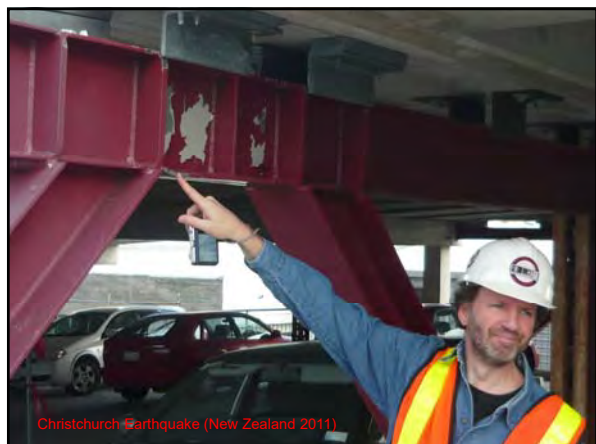

University at Buffalo The State University of New York

Hierarchy of Priorities (Post-Earthquake)

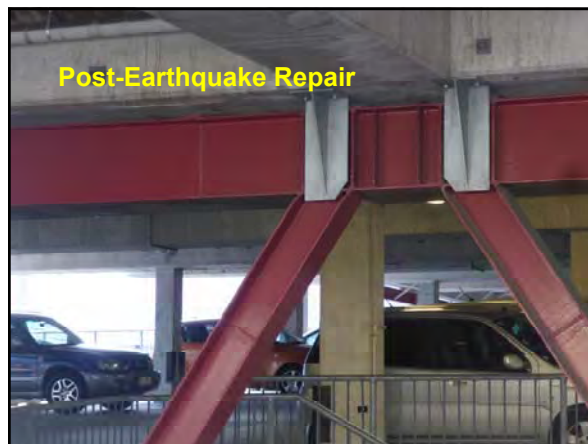
Tenants

- Purpose
- Functionality
- Lease Cost
- Image
- Business Continuity
- Reparability

- Many felt RC buildings did not perform well
- Heavy media coverage of buildings collapses, severe damage, leaning buildings, trapped occupants (e.g. stair collapse), etc.
- Many buildings with low damage (beam plastic hinging and rebar elongation) were deemed "irreparable" and demolished
- **Life safety seismic performance objective: buildings (generally) behaved / were damaged as engineers (but not as public) expected**
- Two tallest steel structures in Christchurch reopening relatively fast after earthquake, led many tenants and owners to conclude that steel structures are preferable



Christchurch Earthquake (New Zealand 2011)



Post-Earthquake Repair

University at Buffalo The State University of New York

Rebuilding of Christchurch (10+ years later)

- Some damaged buildings still there; most demolished
- Construction Types used in Reconstruction (still on-going)
 - A few base-isolated buildings
 - A few buildings with viscous dampers
 - Some EBFs with replaceable links
 - A few rocking (self-centering) frames
 - Some moment frames with friction connections
 - Multiple buildings with BRBs
 - Mostly steel construction (CHCH was a concrete town)
 - One "cardboard" church
 - One Cathedral maybe rebuilt to collapse prevention level

<http://resources.quakecentre.co.nz/reconstructing-christchurch/>
 or <http://www.michelbruneau.com>

University at Buffalo The State University of New York

Reconstructing Christchurch: Quantitative Findings on Shift in Building Structural Systems

Michel Bruneau, Ph.D., P.Eng
 Department of Civil, Structural and Environmental Engineering
 University at Buffalo

Gregory A. MacRae, Ph.D.
 Department of Civil and Natural Resources Engineering
 University of Canterbury

Free Download

<http://www.michelbruneau.com>

University at Buffalo The State University of New York

Structure of the Book

- Meet the Hazards
- Meet the Little Pigs
- Meet the Future

University at Buffalo The State University of New York

Meet the Future

Not part of today's presentation (one needs to read the first two parts to fully enjoy this third part)

- A glimpse of what the future might have in store, extrapolating from our approach to disasters to predict how some existential threats will play out, focusing specifically here on the joyous topics:
 - Monetary fragility
 - Climate change
 - Overpopulation
 - Nuclear holocaust
 - ... and – on the way there – putting to rest the myth that resilience will save the day

MEET THE FUTURE	
Glossary Preface	263
The Silent Heroes	271
Truth and Lies about Resilience	278
Dollars are Expensive Over Miles	283
We're All Cooked	302
Elbow Room	318
Nuclear Holocaust	333
Art V	348

The Blessings of Disaster

The Lessons That Catastrophes Teach Us and Why Our Future Depends on It

Publishers Weekly: "Fascinating (...) An engrossing study of human complacency, myopia, and faulty risk perception on a grand scale."

#8 in Top Ten "Best books of 2022: Nonfiction"
— SteveDonoghue.com

"Surprisingly, the ultimate effect of The Blessings of Disaster is to offer hope and new considerations of the ultimate world-changing effects of disaster management. (It) offers plenty of solid science, engineering, and food for thought and debate."
— Midwest Book Review




From Engineers

ENR **Review**

"The Blessings of Disaster is an interesting and unique read: informative and well versed in research across many different knowledge areas but very often breezily informal and deliberately humorous in tone. But never at the expense of Bruneau's realism: he has written a work that he hopes people will learn from — but, by his own admissions, knows they probably won't."
— ASCE, Civil Engineering Magazine

"Bruneau has tucked serious and rather involved ideas about risk, engineering, safety and society, as well as life in general, into a book that is also entertaining. He writes poignantly of the contradictions of a technologically advanced civilization. (...) The blessings of disasters are harsh lessons that show much, I'm afraid, about our own capacity for folly."
— Engineering News Record



From Social Scientists

"What Michel Bruneau exposes in considerable detail, but with delightfully lucid prose and plenty of twinkle in his eyes, are the ever-present failures of learning and unlearning. (...) A treatise on triumph and tragedy. It is a great read."
— Environment: Science and Policy for Sustainable Development (review by Tim O'Riordan, Emeritus Professor, School of Environmental Sciences, University of East Anglia, Norwich, UK)

"This book provides a readable, deeply informed window into the reasons why we cycle through disaster after disaster with little meaningful transformation of our regulations or our risk reduction strategies."
— ASCE Natural Hazards Journal (review by Daniel P. Adrich, Director, Security and Resilience Studies Program, and Professor, Dept. of Political Science and School of Public Policy and Urban Affairs, Northeastern University)

"Describes the self-delusional misinterpretation of statistics that people regularly apply to personal disaster risk when it conflicts with personal locational preference"
— Journal of Public Works Management & Policy (review by Richard G. Little, Infrastructure Policy Consultant, Visiting Research Scholar at Rochester Polytechnic Institute)




A Tool: Building Bridges

structural PERFORMANCE


- MB article for Structures magazine
- How to enhance resilience of infrastructure?
 - "Silent heroes" (one nudge at the time)
 - Wait for disasters to open window of opportunity
 - Use the book as a tool (a "bridge") to inform public on exposure of infrastructure to disasters and range of possible solutions...

It Takes a Disaster... or maybe not?
Building Bridges in a Riskier Society



Not-so-subliminal message

- ... because a knowledgeable public is a "necessary condition" to achieve a resilient society



By AI Image Generator •
https://www.freemove.com/img/422427-
Real-time-3D-book-only-on-background

Selected "bits" from the whole story

- Willingly (or nonchalantly) exposing ourselves to hazards, "setting-up the stage" for major disasters
- Generally know where severe hazards will strike
 - It is not a matter of where; it's only a matter of when
- Can only predict future occurrences in probabilistic terms – which does not "connect" instinctively with human nature
- Silent heroes move the needle, one nudge at the time, to progressively create (over decades) a world more resilient to disasters
- Disaster puts jet engines on the needle: It opens of Window of Opportunity for immediate changes

University at Buffalo The State University of New York

In Closing – Part 1

- The goal in writing *The Blessings of Disaster* was to provide a truthful but effective journey through the world of disasters, and to make it enjoyable.
- Along the journey, you will discover connections between natural disasters, crooks, cows, hijackers, the Three Little Pigs, nuclear holocaust, movie reviews, viruses, scapegoats, trading stamps, real estate agents, Chinese hockey sticks, airport proctologists, and many more.


University at Buffalo The State University of New York

In Closing – Part 2: Are we doomed?

- Without hesitation, the answer is an absolute, confident and unwavering:

It depends!

...on what you will do...



... Because

Our response to existential threats depends on whether we learn from, or ignore, these lessons

www.michelbruneau.com

www.linkedin.com/in/michelbruneau

