Lecture 1A

Course outline and introduction

Dr Tom Raimondo

UniSA

About the course

WELCOME TO ENGINEERING & ENVIRONMENTAL GEOLOGY!

Course coordinator

- Tom Raimondo (tom.raimondo@unisa.edu.au)

Lecturers

- Tom Raimondo
- Ian Clark (ian.clark@unisa.edu.au)
- Laura Rollison (laura.rollison@unisa.edu.au)
- Barry Cooper (barry.cooper@unisa.edu.au)

Practical demonstrators

- Laura Rollison (laura.rollison@unisa.edu.au)
- Daniel Howlett (daniel.howlett@adelaide.edu.au)

About the course

Lectures

- Wednesday 9–11 am (MLK, Room GP1-09)

Practicals

- Wednesday 11–1, 1–3, 3–5 pm (MLK, Room H1-20)
- **You must attend the session in which you are enrolled** – we have limited prac materials for each class, so if too many students rock up there won't be enough to go around
- Missed practicals are hard to make up, and the skills you learn in them will be core components of the exam material and field trip reports

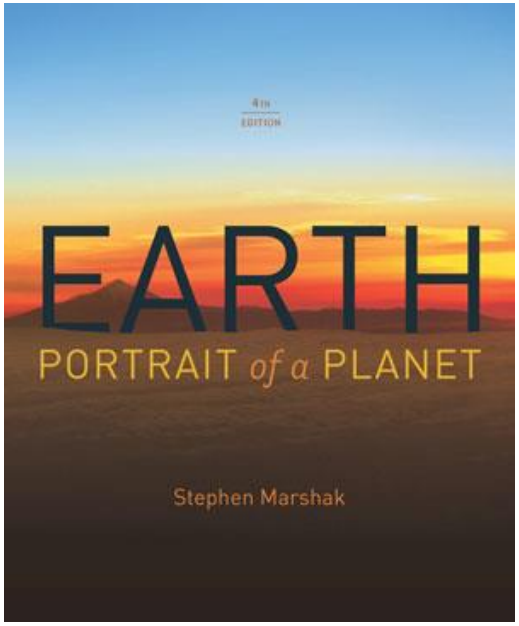
About the course

Textbook

- *Marshak, S. 2012, Earth: Portrait of a Planet, 4th Edition, W.W. Norton & Co.*
- This book will be a core text for Landscape Fundamentals (EART 1010) and a reference for Soils In The Australian Landscape (EART 1011) and Landscape Hazards and Disasters (EART 2011), so it is well worth getting
- Available as hard copy, loose leaf hole-punched and eBook versions (visit http://books.wwnorton.com/books/978-0-393-93518-9/)

Study resources linked to the textbook are available online at: http://wwnorton.com/college/geo/earth4/

- Use a study plan to map your progress
- Study with interactive flash cards
- Take quizzes and test your knowledge
- Use animations to help your understanding
- Learn from Science and Society features
- Links to Google Earth and eBook sections
- Links to Geology in the News



About the course

Other resources

- **Library** – contains many introductory texts that will provide relevant information
- **Online resources** – there are many useful websites. See the Course Outline for some recommended examples. I will also regularly give you additional online content in the lecture notes
- **learnonline** – access to all course information including lecture notes, practical handouts, study aids, etc.

  https://lo.unisa.edu.au/course/view.php?id=1140

About the course

Assessment

- Weekly quizzes (5%)
- Take-home quiz (10%)
- Practical work (20%)
- Hallett Cove field trip report (25%)
- Exam (40%)

**** See the Course Outline for full details and important dates ****

In particular, bear in mind that we have half- or full-day field trips in **Week 2** (**6 August** to Kangaroo Creek Dam), **Week 7** (**10 September** to Hallett Cove) and **during the mid-term break** (**1 October** to the Adelaide metropolitan beaches). There is also a self-guided field trip in Week 11 to North Terrace. **These dates are provided in advance so that you can organise alternative arrangements if you have any clashes.**

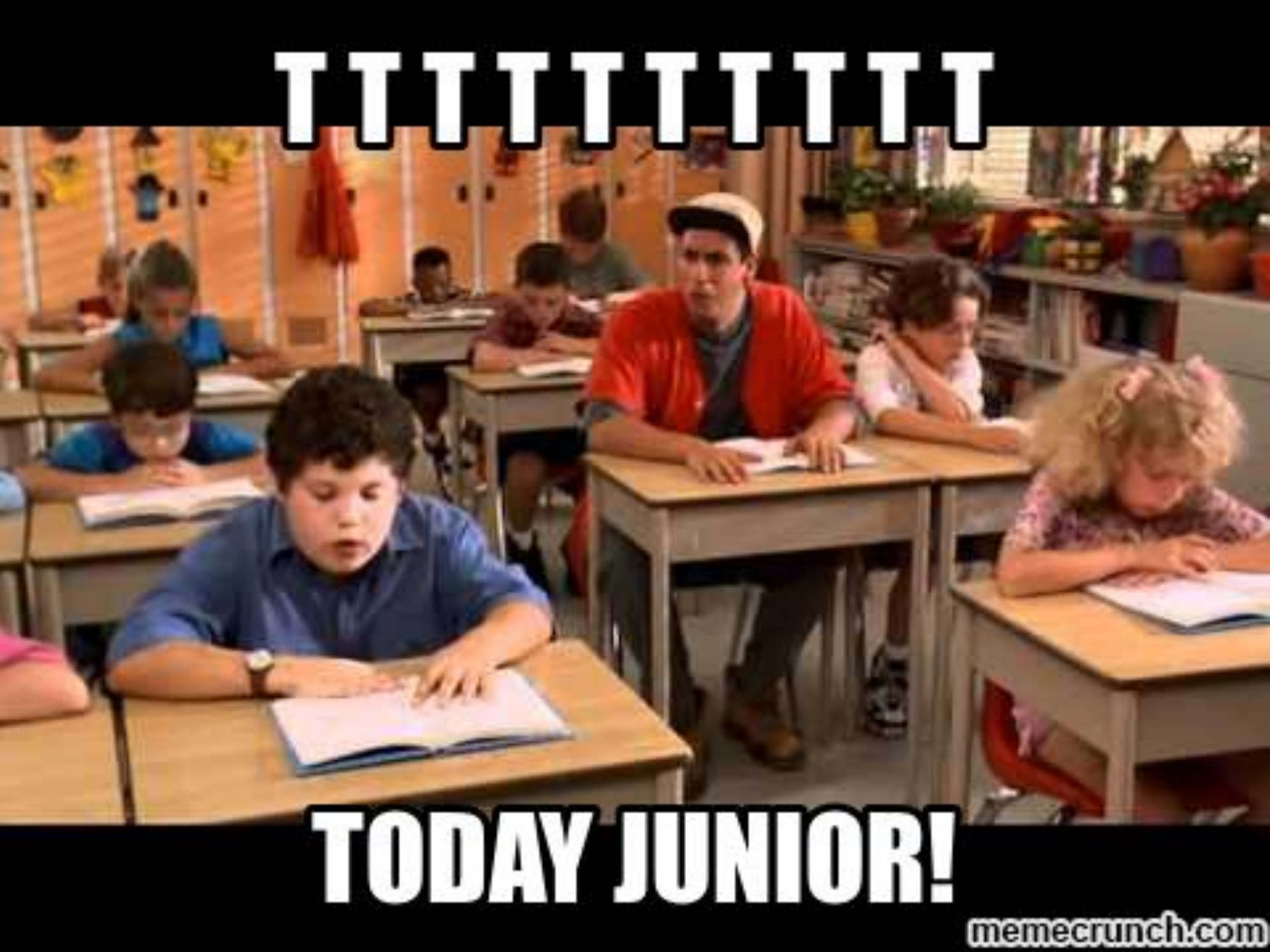
About the course

All students need to enter their details into the online medical database. This is an essential requirement for field trips - **if you do not complete the form, you will not be able to attend the trips.** Students can access the form via the School website (see link below) – please note you **MUST BE ON CAMPUS.**

This needs to be done ASAP. As in, TODAY.

Students can access the form via the the School of NBE Current Students web page (direct link: http://ieeweb2.ml.unisa.edu.au/smd/p1.aspx).

If students have previously completed the medical information database online, they will not need to resubmit. They can however update their information with changes at any time.


TTTTTTTTT
TODAY JUNIOR!
memecrunch.com

About the course

Please add a picture to your learnonline profile!

University of South Australia

Engineering and Environmental Geology - SP5 2014 | My Courses | My Dashboard | Course Offerings

HOME / EART 3012 / PARTICIPANTS / TOM RAIMONDO / VIEW PROFILE

WELCOME

Welcome to Engineering & Environmental Geology. In this course we apply the major concepts of geology to engineering and environmental problems.

Read more...

ADMINISTRATION

- Course administration
- Switch role to...
- My profile settings
  - Edit profile

Tom Raimondo (EART 3012 (1140))

Hi, my name is Tom Raimondo and I am your unit coordinator. Welcome to Geology@UniSA!

Email address	Tom.Raimondo@unisa.edu.au
Last access	Monday, 28 July 2014, 4:34 PM (13 secs)
Roles	Course Coordinator,Instructor
Course profiles	Landscape Fundamentals, Geolab, Engineering and Environmental Geology, Engineering and Environmental Geology

Full profile

About the course

Academic Integrity

The university has policies and procedures in place to manage academic misconduct for all students. Academic misconduct includes:

- **Plagiarism**
- Presentation of data with respect to laboratory work, field trips or other work that has been **copied, falsified or in other ways improperly obtained**
- Inclusion of material in individual work that has involved **significant assistance from another person**, where such assistance is not expressly permitted

Students' work may be **checked for plagiarism** using a variety of means, including text comparison software (e.g. *TurnItIn*). Assignments checked electronically will be held in a database for future matching processes.

Last year, **more than 20 students** were penalised for plagiarism offences. Don't make same mistakes as they did! If you are unsure about whether something is plagiarism or not, **please come and ask** – we are more than happy to help.

Course structure – week-by-week

Available at any time from the learnonline site:
https://my.unisa.edu.au/public/CourseOutline/ViewOutline.aspx?id=10460

Week	Dates	Topic	Practical	Assessment details (Adelaide Time)	Public Holidays
	14 - 20 July	Pre-teaching			
	21 - 27 July	Pre-teaching			
1	28 July - 03 August	(a) Course outline and introduction (b) Mineral properties and identification	Mineral properties and identification		
2	04 - 10 August	(a) Structure of Earth's interior; plate tectonics (b) Weathering and erosion	**FIELD TRIP: Kangaroo Creek Dam**		
3	11 - 17 August	(a) Rock groups and the rock cycle (b) Igneous rocks and processes	Igneous rocks		
4	18 - 24 August	(a) Metamorphic rocks and processes (b) Rock relationships and time; a review of fundamental geological concepts	Metamorphic rocks		
5	25 - 31 August	(a) Structural properties and relationships; brittle and ductile deformation (b) Geological maps and cross-sections	Geological maps		
6	01 - 07 September	(a) Stereographic projection (b) Geophysical techniques and remote sensing; applications to geotechnical problems	Stereographic projection	Quiz due 02 Sep 2014, 5:00 PM	
7	08 - 14 September	NO LECTURE - Field trip scheduled instead	**Hallett Cove field trip** ***Major field project assessment item***		
8	15 - 21 September	(a) Coastal environments and processes (b) Earthquakes and seismic waves; engineering design for prevention and management	Coastal processes on the Adelaide metropolitan coastline	Hallett Cove assignment due 19 Sep 2014, 5:00 PM	
	22 - 28 September	Mid-break			
	29 September - 05 October	Mid-break	**Metropolitan beaches field trip (1 October)** ***Practical assessment item***		

Sweet weekly homework

Every week, there are regular tasks that must be completed. There are clear expectations about the amount of time you should spend studying this course.

	Contact time per week	Non-contact time per week
Lectures	2 hours	1–2 hours pre-reading and revision
Practicals	2 hours	1 hour pre-reading
Weekly quizzes	-	30 mins to 1 hour
eModules	-	30 mins to 1 hour
Textbook online resources	-	30 mins to 1 hour
Total	**4 hours**	**4–5 hours**

Need support in this course because of disability, medical or mental health issue?

If you haven't already

- Contact the Disability Adviser at the Learning & Teaching Unit on your campus
- They will consult with you regarding your needs
- The service is confidential
- A Disability Access Plan can be developed

Speak with your Course Coordinator about your Disability Access Plan. You may need to:

- Negotiate extensions
- Plan for tests and assignments
- Plan for issues such as class absences
- Arrange access to course information such multimedia and pod-casts

Eng & Env Geology is social!

Like us on Facebook!

https://www.facebook.com/pages/Enviro-Science-at-UniSA/133485416707354

About the course

ANY QUESTIONS?

Ok then…what is this course all about?

VS.

Ok then…what is this course all about?

How important is geological knowledge to Civil Engineers (or Environmental Scientists)?

Why is it worth studying?

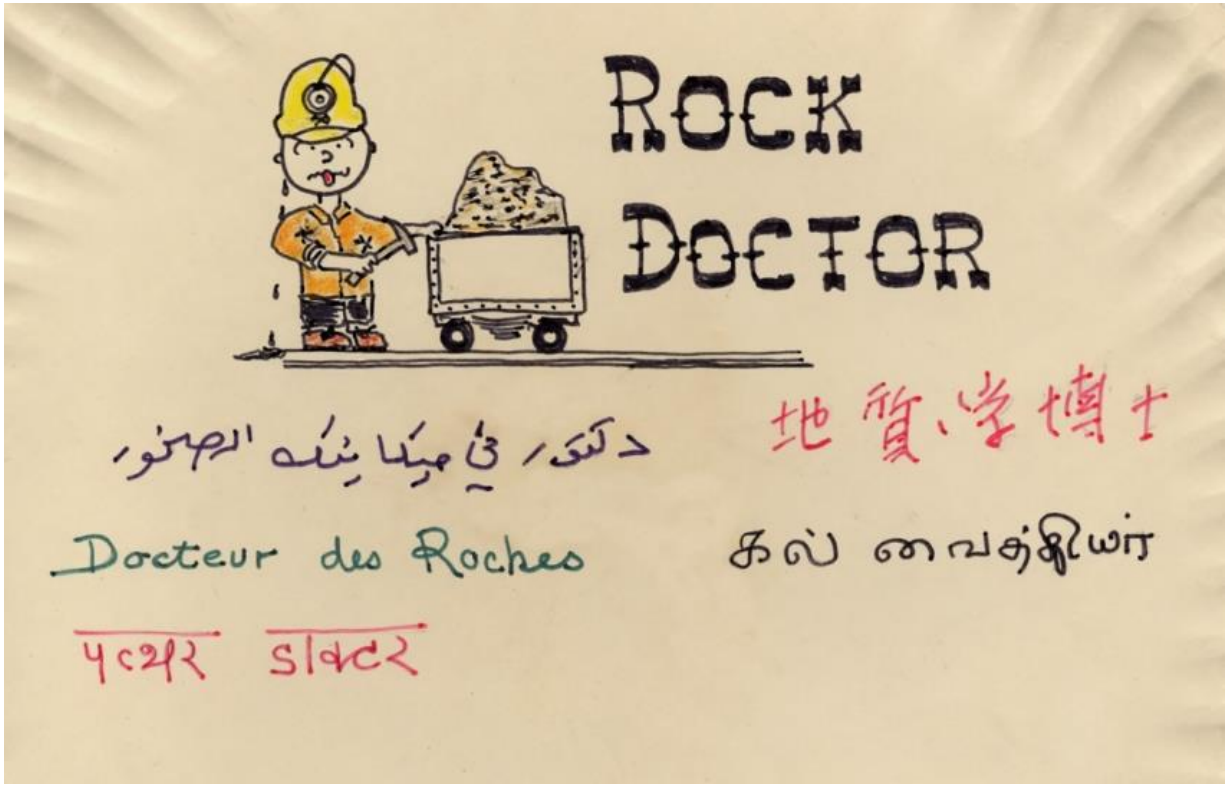
https://www.youtube.com/watch?v=aOQp3FHOPyQ
https://www.youtube.com/watch?v=_CBQv8Y3V4o
https://www.youtube.com/watch?v=8oKQmYndGfQ

Ok then…what is this course all about?

https://www.youtube.com/watch?v=DWiIlhAh2-U
https://www.youtube.com/watch?v=F7Me34nWOXY

Ok then…what is this course all about?

PollEv.com/rockdoctor



Ok then…what is this course all about?

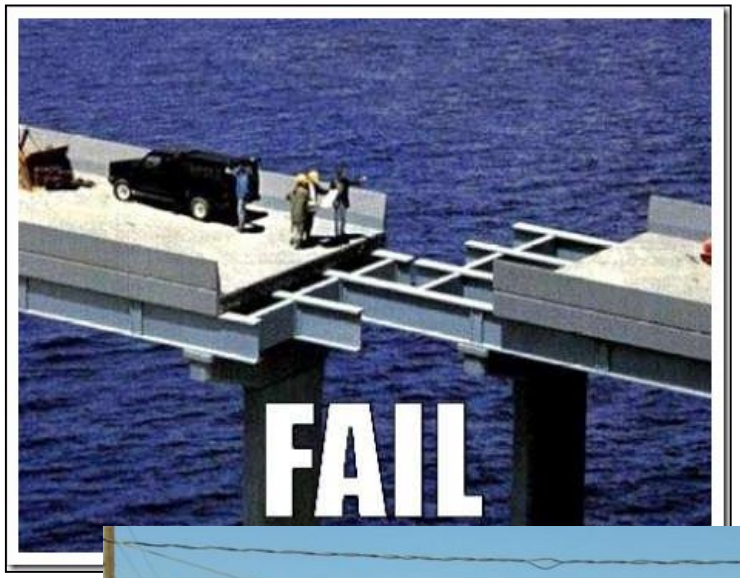
Here's part of my answer…
why would you want to study geology?

A geologist, outstanding in his field.

http://uncyclopedia.wikia.com/wiki/Geologist

Why do engineers need to study geology?

Well…what do all engineering structures have in common?



Why do engineers need to study geology?

What do all engineering structures have in common?

- They are built on and supported by **rocks** and **soil**
- All structures are located within the natural environment, and have a profound impact on it
- Understanding the **physical and chemical properties** of this environment is therefore critical to all engineering projects

Geohazards: who is responsible?

What are some geological phenomena that have engineering implications?

Newcastle earthquake – December 28, 1989

- Magnitude 5.6
- 13 deaths, 120 injuries
- 2000 people expected at Newcastle Workers Club only hours after the quake
- 50 000 buildings damaged, 300 buildings demolished
- $4 billion total damage bill

Geohazards: who is responsible?

Newcastle earthquake – December 28, 1989

- Newcastle has a long history of earthquake activity
- The earthquake building code did not require earthquake-resistant design for new buildings or the strengthening of old buildings
- Several old buildings contained unreinforced masonry
- Steel structures were heavily corroded due to proximity to the coast
- Buildings were constructed on soils with high potential for seismic shaking

Geohazards: who is responsible?

What are some geological phenomena that have engineering implications?

Thredbo landslide – July 30, 1997

- Two ski lodges collapsed following a catastrophic landslide
- 3500 tonnes of debris slipped down the slope
- 18 killed
- NSW government spent $40 million in out-of-court settlements with 91 businesses and individuals after the incident

Geohazards: who is responsible?

Thredbo landslide – July 30, 1997

"The hill that gave way was covered in springs and the most likely geological explanation for the landslide was that water weakened the stability of the slope above Carinya Lodge."

MELBOURNE AGE, July 30, 1997

"Lawyers said legal liability for the tragedy would focus on whether approval for building the two crushed lodges should ever have been given on such a steep hillside or whether engineers should have foreseen the potential for a landslide."
MELBOURNE AGE, July 30, 1997

"…the cause of the devastating Thredbo landslide has been established - a leaky mains pipe and a road built on a vulnerable slope of debris."

SYDNEY MORNING HERALD, December 3, 2004

Geohazards: who is responsible?

Other disasters with critical engineering aspects

- **Floods**

  New Orleans, 2005

  ~1800 killed due to failure of levee system

- **Tsunamis**

  Indian Ocean, 2004

  ~230,000 killed following magnitude 9.1 earthquake

  Coastal communities and infrastructure devastated by impact

  Japan, 2011

  ~15,500 killed following magnitude 9.0 earthquake

  Ongoing environmental hazards due to leakage of radioactive waste from dangerously situated and poorly shielded nuclear powerplants

  Dam rupture; building collapse; landslides

Geohazards: who is responsible?

Geological issues impact basic infrastructure and environmental sustainability

The bottom line

Engineering mistakes that failed to take into account basic geological knowledge can result in losses of life, cost huge amounts of money, and produce significant environmental damage.

The 'Tombstone' left behind in the aftermath of the St Francis Dam disaster, California

Why is Geology important?

- *Geology* and *Environmental Geoscience* are all about **understanding the Earth system**: how it operates, how it can be utilised effectively, and what its dangers are
- These scientific disciplines play a crucial role in implementing effective practices for its management and sustainability
- Examples above show that the engineering and Earth systems are intimately linked – all constructions are susceptible to Earth processes, and can be damaged or destroyed by them
- Negligence could cause an engineering disaster, and litigation can be extremely costly

Why is Geology important?

All engineers need **fundamental geological skills**:

- Understanding Earth processes and the potential risks they present
- Identifying important minerals and rock types
- Recognising different types of soil and their properties
- Reading and interpreting geologic maps
- Identifying geological structures and their implications

With these skills, at the very least you will know what type of geologist to consult, and more importantly, how to **interact** and **effectively communicate** with geologists.

Why is Geology important?

But don't take my word for it – you can see the links between geology and engineering first-hand next week…