



Promoting the Surveying Profession in New South Wales, Australia

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Institution of Surveyors, NSW Inc.
Careers sub-committee



Context in NSW

- NSW has about 1500 Registered Surveyors of which around 900 are active
- If they stay in practice for 30 yrs, we need around +30/yr to maintain a steady state
- However, most are mid-50s and we have more Registered Surveyors over 60 than under 40 (Fryer, 2008)

We need graduates who become registered

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ISNSW Careers sub-committee

- Setup to encourage high school leavers and others to commence a career in surveying
- Member based group comprising 10+ surveyors
- Regular monthly (face-to-face and teleconference) with agendas, minutes, an allocated budget and action items
- Members well distributed across NSW
- Work experience, careers markets, Surveying Spectaculars, marketing campaigns

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Work Experience

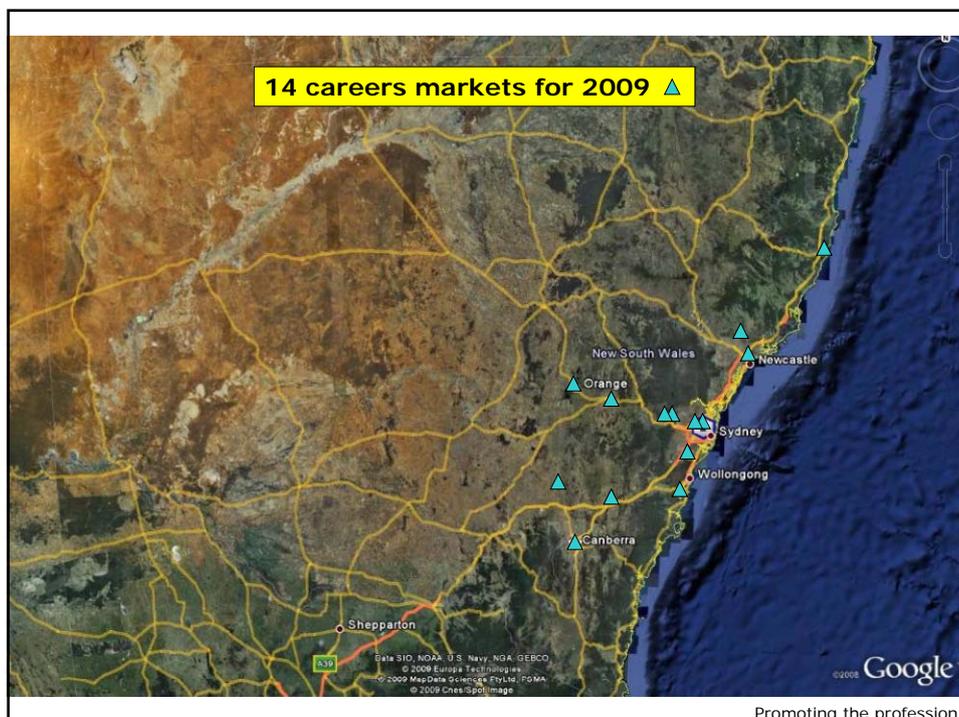
- One of the best forms of promotion for the profession is work experience
- Surveyors can offer some real work to high school kids
- Danger that surveyors are not prepared and offer a poor experience
- Committee tries to advise members about Occupational Health and Safety, Child Protection, Privacy, Equal Opportunity and Anti-Discrimination legislation
- Surveyors should seek a good relationship with local careers advisor at school

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Careers Markets

- Organised by local Rotary clubs and clusters of careers advisors in common geographical regions
- Designed to be “one stop shops” for year 10 and 11 students to consider their career options
- Careers committee coordinates a box with banners, DVDs, posters and promotional brochures from the TAFEs and Universities in NSW.
- Local coordinators attend markets and promote the profession to local high school students
- Last year ISNSW attended 14 careers markets across NSW

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Careers Markets



ISNSW booth at various careers markets

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Surveying Spectaculars

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Aims of Surveying Spectacular

- Develop a passion for mathematics through it's practical application
- Promote awareness of what a surveyor does
- Encourage students to consider surveying as a career

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The strategy

- Give them some interesting mathematical problems surveyors face, BUT
- THIS IS NOT AN EXAM!
- We try to get the students to think for themselves, assisting them only if they have trouble.
- Involve them with our toys and as much hands on as possible
- THE EXPERIENCE MUST BE ENJOYABLE!

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Bicentennial Park

- Central location
- Bus parking
- Toilet facilities
- Open spaces and trees



- Sundial
- Towers and sculptures
- Geometric gardens
- Classroom to set up a computer lab

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Program of Activities

- | | | | |
|----|--|----|--|
| A. | Height of Treillage Tower using trigonometry | D. | Sundial, Radius of earth by Eratosthenes' method |
| B. | Mapping in the Hedged Garden | E. | Peace Monument – Heights using similar triangles |
| C. | Photogrammetry, Laser Scanning, Historical Surveying Equipment | F. | MiniCAD in computer classroom |

Time slot	Group1	Group2	Group3
9:00 - 9:20	Arrival, registration, brief introduction		
9:25 - 10:00	A	B	C
10:05 - 10:40	B	C	A
10:45 - 11:20	C	A	B
11:25 - 12:00	LUNCH		
12:05 - 12:40	D	E	F
12:45 - 1:20	E	F	D
1:25 - 2:00	F	D	E
2:00 - 2:15	Tidy up, return equipment, collect showbags		

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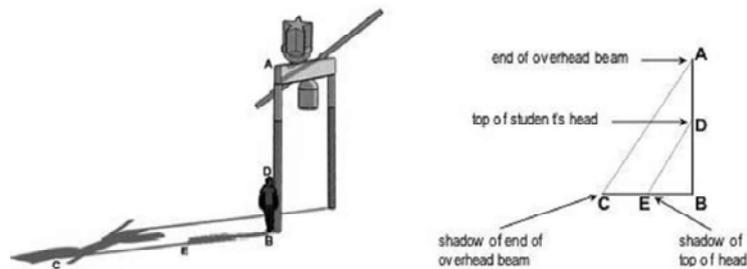
The Surveyor's Playground



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Measuring the Peace Monument

- Measuring shadows
- Applying similar triangles



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Measuring the Peace Monument

If there is
no sun, there is
an alternative
method...

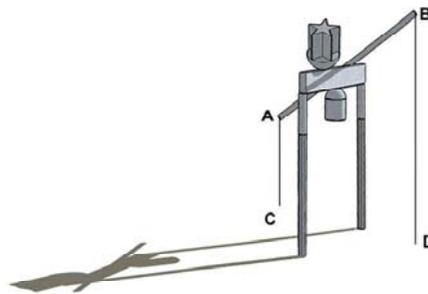


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Measuring the Peace Monument

Challenge –

- Find the length of the overhead beam AB



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Mapping the Hedged Garden



- Use a tape measure to measure up one of the lawns and a magnetic compass to find bearings
- Prepare a table of bearings and distances to use later on to draw a map using a CAD program
- Draw a scale map of the lawn on grid paper provided
- Locate hypothetical hidden land mines under the grass given some bearing/distance information
- Calculate the area of the lawn

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Mapping the Hedged Garden



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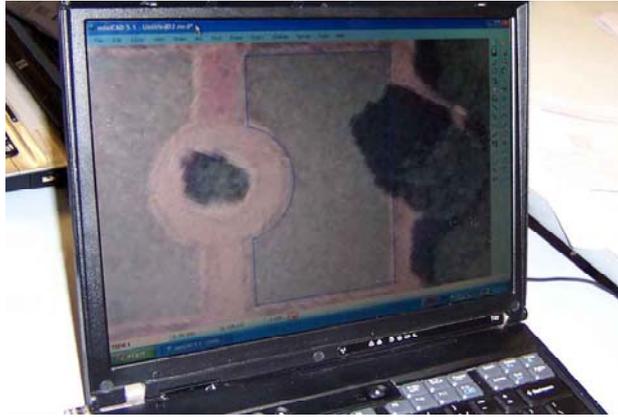
miniCAD: the computer classroom



- Students enter bearings and distances to create a map on screen.
- The software lets them draw the circular arcs and calculate the area.
- They enter information about the landmines to mark their positions.
- An aerial photograph can be "geo-referenced" to check their measurements.

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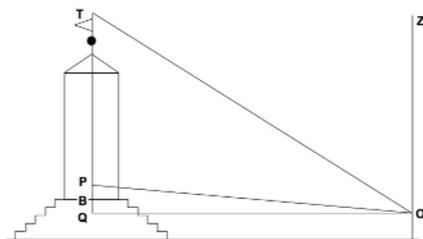
miniCAD: the computer classroom



The end product!

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Height of Treillage Tower



- Students begin by estimating the height of the tower
- Using a total station they measure zenith angles from the observation point O to the top of the tower T, and to point P vertically below T
- An EDM allows them to find the exact distance to the prism (OP)
- Trigonometry in right-angled triangles is used to calculate the height of the tower

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Height of Treillage Tower



Students hard at work



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Activities around the Sundial



- How a Sundial works
- Finding the radius of the earth using Eratosthenes method
- Looking at Daylight stars



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History of Surveying



... and theodolites

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Photogrammetry



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Laser Scanning



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Setting out and identifying a pattern

- Using surveying equipment to pinpoint locations on the lawn
- Estimating distances and directions



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Take home goodies

- At the end of the day, all students take home a free USB flash drive with the ISNSW logo and the NSW "Open Up Your World" surveying video permanently burnt onto it
- The flash drive is placed in a showbag with tertiary study information and a "Surveyors Rule" ruler

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Publicity

- We invite the education editors from the Sydney Morning Herald and Daily Telegraph
- We send an invite to every local paper which has a school in its distribution area attending
- TV?

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The measure of success

- Partially intangible. Feedback forms provide some guide to assess if we are achieving our aims
- We make all schools give us their students names under the pretext of printing name badges
- We want to match student names against tertiary entrance into surveying courses

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Schools Promotion

- Presentation to Year 2 students!
- I made my jigger turn right angles with no hands
- 2 right angles makes a straight line
- They made a map using right angles
- They all looked through my jigger

THE PROFESSION

PHILIP SPINERON
OF THE
SPECIAL FORCE
RESEARCHERS
DAN THOMAS HYDELL
AWARD DEER

The Magic of the Right Angle

Last year I was fortunate to hear a very interesting speech by Peter Taylor, Chief Executive of Engineers Australia to the National Press club.

He had noticed that the percentage of students doing a high enough level of mathematics to enter Engineering is so small, that the pool of potential Engineers is not big enough to sustain their profession. Engineers Australia believe that most students are making the decision not to pursue a high level of mathematics as early as Year 4 of school.

Last week I got really ambitious and ran a 1 hour lesson with my own Year 2 class, where I introduced them to the 'magic of right angle'. I had borrowed their maths text book and while it is full of useful concepts, most of them are very basic. The only angle mentioned in it was the right angle, and they had some direction exercises with them, saying if you go 2 down, 4 right and 3 down, where do you end up. With no knowledge of angles or coordinates, I wasn't sure how I could inspire them to learn more! After much consideration I decided to show them an exercise I had done for the top Year 5/6 class with my miniCAD software. The Year 5/6 exercise was done in 2 stages, mapping the local oval, designing a track for the athletics centre that lined up the oval and finally setting it out. So I started off by turning on the map of the oval, then I turned on the lines consisting the running track and lastly I turned on a geo-referenced aerial image of the oval. I zoomed and panned the screen a bit, moved some units and she said to them that if they worked really hard at maths they would get to do that exercise with me when they got to Year 5.

I then introduced the 'magic of right angle'. My robotic jigger was on the teacher's desk, and I sensibly made it turn right angles both horizontally and vertically. I straightened the two right angles placed together made a straight line (demonstrated using the jigger) and you could use right angles to make a map. Outside their classrooms they have a number of ways placed roughly at right angles to each other, so I made a sketch of the area and drew many numbered dotted lines at right angles, that I required to be measured. The class was broken into 6 groups of 4 students and I had allocated a few number ranges to each group. After they had taken their measurements and given me their field sheet, we returned to the classroom where I used miniCAD to prepare the map and overlay an aerial photograph of the area.

Then the teacher asked them to write a story about what I had taught them. Many of them were very good. I will finish off now and let the photos of the kids and some of their stories do the rest of the talking. The kids were so impressed, that I have been invited back next term to present another Year 2 maths lesson. *By Ian Ingle*

Mr Ingle taught us that two right angles joined together make a straight line.
Nick

Dad has a great job and I am proud of him.
Mike



Today Mr Ingle came to our classroom to teach us about measuring right angles and measurement so we went outside and measured the yard, but some where the same. We had to go as well with the things we could not do. We had to look through a jigger like this.



After Peter's my teacher came to our classroom. He taught us about right angles. Then we went outside to measure the water tanks. Mr Ingle made a map with his robotic total station. Then Mr Ingle got the robotic total station that we looked through it.

ADULTS: MARK DEER

17

Schools Promotion



- 3 distinct exercises
- Students map oval and obstructions
- Students design running track
- Students setout running track

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Schools Promotion



A Surveying Spectacular at Queenwood School

The 31st July was a magnificent sunny winter's day. "Too good for work", thought 11 surveyors, as they made their GPS, robotic theodolites and total stations down to the beach at Mowbray.

These days were spent in the studio and well over 1000 students for an introduction into the practical application of mathematics in the real world. The aim was to provide interest in learning as a future career for some of them.

The site was chosen to be near the Mathematics Centre where the building and the water tower were arranged for surveying to be presented to the audience as a real world problem to solve. We were backed by the Queenwood High school which is a public school at Queenwood. The building was built by the architect and built in 1910. The school had 1000 students and 100 teachers. However, thanks to the support of the ACS and business sponsors, we were able to build the structure.

The team of CSE, Russell MacCubbin, Steven Stone, Vladimir Simbrich, and young people. They worked hard to build the structure, which for 'Mowbray' was the building, Geoff Brindall, John Richards and myself.



- 100 Year 10 girls
- 2 bearing intersection to a lighthouse to calculate its location
- Vertical Angles to calculate its height

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Maths Association Conference

New Ways to Think Spatially
A different approach to the promotion of Surveying as a premier career option.

Over the last few years there have been numerous meetings and discussions over the ways to which the outlines in the numbers of Surveying course requirements could be varied around about the country (the NSW Education Office) and putting in place an alternative approach to the promotion of Surveying as a premier career option.

These initiatives involve 'telling' Surveying directly to the school children. Our recently a Surveyor – Jan, and a maths teacher – Peter, have been working with a group of teachers who teach the maths. The idea was to have a maths teacher at Queensland South High School to tell the students in a practical way to each part of the mathematics syllabus to high school students of Queensland.

These teachers are students about learning, angles, circles, maps & applied geometry by doing simple field exercises on the school land and then by using Jan's field notes to measure various of the Surveying syllabus, give the students to prepare simple maps and plans in the classroom.

On Saturday 10th September 2008 Jan & Peter presented a paper at the 2008 International Association of Surveying (IAS) annual conference held in Sydney to think spatially. The IAS 2008 conference was one of the best ever held in Sydney. It was held in a very modern and comfortable venue in the Sydney CBD. The IAS 2008 conference was attended by about 100 people from all over the world, and gave a demonstration of the new course.

Jan & Peter's presentation, seminar notes and associated resources they use well placed, highly professional, and very well received by those in attendance.

Presently we could see how a large number of maths school teachers contributing to the promotion of Surveying to secondary students. The increasing effect of Jan & Peter's efforts should be updated by all in the Surveying profession.

Success might not be as easy as it appears to be, especially given the Surveying as a premier career path to students and the wider community.

Steve Dean for a bit later

- The first of 3 successive years presenting here
- 1 – Peter's school
- 2 – Queenwood
- 3 – Survey Spectacular

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Latitude

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Maths Curriculum

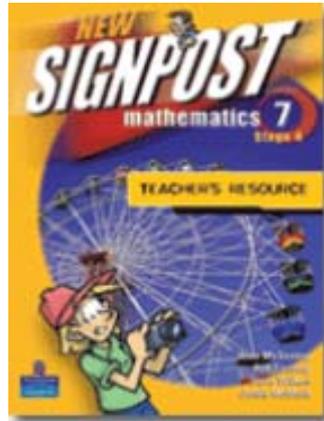
- Fruitless attempt to influence the NSW curriculum. Next try National!



National Mathematics Curriculum: Framing paper
 For consultation: November 2008 – 28 February 2009

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Maths Textbooks



- Guess who plays comp tennis against a guy who writes Maths texts?
- Next publication has a chapter on SURVEYING!

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Advertising materials

- Careers committee have produced banners and posters for the Careers market booths
- Members of the committee are also active in producing other materials ie SMIC brochure and DVD (in cooperation with ACS)
- Try to keep website up to date

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Media opportunities

- SMH weekend careers section June 13, 2009

You have the natural talent.



We have the technology.



Surveying - Engineerings' best kept secret.

Surveying is an ideal career for young people who love to wear their boots and carry a laptop around interesting outdoor sites.

You could be working on a building site or on earthworks for a new motorway.

Or measuring the harbour floor from the deck of a hydrographic vessel. Or mapping an open cut mine. No two days will be the same and you need never complain about being stuck all day inside an air-conditioned office.

A surveying degree-qualified professional enjoys high employment rates with attractive salary ranges - across the globe.



For a careers pack call (02) 9264 2076 or visit www.surveyors.org.au/careers

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Media opportunities

- Newcastle careers market, May 2009



Did you know that Surveying helped save the Pasha Bulka?

A survey team set off in swells of 3-4 metres to survey the seabed and plot a suitable escape route after the Pasha Bulka ran aground at Nobby's Beach.

Surveying is an ideal career for young people who love to experience a variety of work environments.

You could be working on a building site or on earthworks for a new motorway. Or measuring the harbour floor from the deck of a hydrographic vessel. Or mapping an open cut mine.

No two days will be the same and you need never complain about being stuck all day inside an air-conditioned office.

For information on a career in surveying, visit www.surveyors.org.au/careers or for a careers pack phone (02) 9264 2076.



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Media opportunities

- North Shore Times, May 2009

NEWS

Figuring it out in the field



IT ALL ADDS UP:
Students Paul Bulkiewicz, Alessio Colla and teacher Malcolm Wilson survey rock carvings. Photo: Keith Lacey

MATHS students from Gleason Rudolf Steiner School took to the great outdoors for a trigonometry lesson in Ku-ring-gai Chase National Park.

The Year 10 students from the Middle Cove school were in the field to survey Aboriginal sites and integrate many other areas of learning.

Teacher Malcolm Wilson said numerous subjects including trigonometry, archaeology, history, geography and geology were being used.

Using theodolites from the University of NSW, the students took measurements of rock engravings so they could translate them into topographical maps.

"We like students to experience what they are studying," Mr Wilson said.

"The study of trigonometry is matched by an experience of surveying in the field and drawing maps for later use.

Student Paul Bulkiewicz, 16, admitted maths was not his favourite subject but had enjoyed learning in the national park.

"I've learnt new skills like how to set up instruments and record results," Paul said.

Another student Alessio Colla, 16, was interested in mapping the rock carvings.

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Media opportunities

- SMH careers section, March 2009

show me the money

RYAN FIFIELD (pictured) knows he's one of the lucky graduates. The 22-year-old finished his bachelor of engineering (surveying and spatial information systems) at the University of NSW at the end of last year and landed a three-year graduate job with the Roads and Traffic Authority.

"In surveying, there are heaps of jobs because there's a real shortage of university graduates," he says. "I have been quite fortunate to get such an awesome graduate placement but all my friends in engineering have been reasonably successful in getting jobs, too."

"Those in commerce are finding it a lot harder to get the job they're looking for."

Fifield is also very happy with the salary package he's been offered. Engineers receive the third highest starting salaries of any graduates

across Australia. Every year Graduate Careers Australia (GCA), a peak body with representatives from government, universities and graduate recruiters, surveys 158,000 recent graduates and 300 employers and compiles tables of their results.

According to their Australian Graduate Survey 2008, dentistry graduates still enjoy the highest starting salaries of all professions at \$70,000 annual income, followed by optometry at \$60,000, engineering at \$54,000 and medicine and earth sciences both at \$50,000.

The median average salary for all new graduates with a bachelor's degree is \$45,000, up from \$43,000 in 2007.

While graduate starting salaries so far seem to be unaffected by the economic downturn, salaries

may not continue their growth, says the executive director of GCA, Cindy Tilbrook. "Next year, it's unlikely we will see graduate salaries reduce but the increases just might not be there," she says.

In the GCA survey, the two top-earning professions, dentistry and optometry, have stayed consistent since 2004 - with only medicine moving down from third place to equal fourth with earth sciences since 2007, while engineering has moved into third place.

These top salaries are greatly boosted by supply and demand, Tilbrook says, and are unlikely to change in the near future.

Dentists, geologists and engineers all feature prominently on the state and territory skill shortage list.

Melinda Ham



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Target the Scout Association

- Scouts are into mapping and the outdoors – perfect for a career in surveying
- Jamboree in Sydney Jan 2010
- Easter activities for statewide Venturers
- Potential problems with leadership training and qualifications

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A life without limits campaign

SURVEYING

A life without limits

SURVEYING | LIFE AS A SURVEYOR | STUDY | WORK EXPERIENCE | PAGES | LINKS | CONTACT US | TEACHERS | INDUSTRY MEMBERS

Surveying is the perfect profession. Mixed work, generous rewards and not enough graduates to go around. Check out the video for an introduction to Surveying and what it's all about.

Surveying defines the world we live in and what belongs where. It offers a unique professional experience working both outdoors and indoors with a vast array of environments. From satellite mapping to urban development to resource exploration, Surveying offers a wide range of specializations. Whether you work for yourself, the government or for a big firm servicing clients around the world, Surveying offers a life without limits.

Download for iPod/Quicktime

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Summary

- ISNSW Careers committee is very active
- Try to focus on hands-on activities and leave high level promotions to others
- Try to coordinate activities and recruit new members of the profession – preferably young – to assist
- New students and new graduates are the professions' life blood.
- Marketing activities can never stop!

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