

Promoting the Surveying Profession in New South Wales, Australia

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SUMMARY

The state of New South Wales (NSW) has about 1500 Registered Surveyors of whom around 900 are active. The average age is in the mid-50s, therefore the Institution of Surveyors NSW Inc (ISNSW) is actively encouraging young people to study surveying and reinvigorate an aging profession.

A 4-year Bachelor of Engineering in Surveying qualification can be studied at the University of New South Wales (UNSW) in Sydney or at the University of Newcastle (UNewc) in Newcastle. A survey technician qualification can be studied at a Tertiary and Further Education (TAFE) campus in Sydney, Newcastle and Wollongong and can articulate into both of the University courses.

ISNSW recognise that few people in the community understand what a surveyor does and therefore cannot imagine choosing this as a career. ISNSW have established a Careers sub-committee to encourage high school leavers and others to commence a career in surveying. It is a voluntary, member based group comprising about 10 surveyors. The committee meets monthly (face-to-face and teleconference) with agendas, minutes, an allocated budget and action items.

The careers sub-committee tries to use the ISNSW member base, which is well distributed across NSW, to help promote the profession of surveying by engaging in a number of activities ranging from offering work experience to local high school students, attending careers markets and supporting a recent initiative called the Surveying Spectaculars.

The Surveying Spectaculars are a full day activity where over 200 high school students (year 10) are invited to a local park to engage in a variety of hands-on surveying and mapping activities. The students are given lots of assistance from the surveyors and volunteers during the activities and are presented with a “showbag” of further information.

This paper will give a brief overview of the activities of this committee with a particular focus on the Surveying Spectaculars. Students who attend these and other activities promoted by ISNSW will be tracked to try and gauge if the various promotional activities have been successful in converting high school students into surveying students at a tertiary level.

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1. OVERVIEW

Over the last decade, there have been a plethora of articles about the malaise of surveying education and the skills shortage in Australia (Baker (1997, 1999, 2001), Brown (2002), Conolly (2000), Douglas (2006), Fryer & Hill (1999) & Kelly (2005)).

Hannah (2006) writes that a close engagement between schools (and their careers advisors) and the tertiary program offering surveying in the area is crucial and that momentum must not be lost – marketing can never stop! More widely the public perception of a surveyor’s role in the community is not well understood and this contributes to the lower profile overall.

Surveyors are generally an introverted group. They offer meticulous attention to detail, possess a thorough knowledge of instruments and methods used for locating and measuring the natural and manmade world and provide these professional services to satisfy specific client needs (often for an undervalued fee). The surveying profession has often been accused of being a “cottage industry” comprising many small firms competing for small to medium size projects. In recent times in New South Wales, some small firms have been merging and consolidating, recreating themselves as larger entities with a national and even international vision. This larger critical mass allows firms to present a more professional face with high quality websites, newer equipment and vehicles and a more diverse career path for young people entering the profession. Serendipitously, these firms are therefore also promoting surveying by offering a more professional face.

The annual “Excellence in Surveying and Spatial Information Awards” organised jointly by ISNSW and the Association of Consulting Surveyors NSW (ACS NSW) (the business association for professional surveyors) have specific categories for “Best University Student Project” and “Best TAFE Student” to raise the profile of younger people in the profession. The university applicants for these awards are also invited to present their work at conferences organised by the profession. This is an intimidating assignment for a young graduate but also recognition by the profession that the work of young surveyors is valuable and important.

The Institution of Surveyors NSW Inc. recognise the need to promote the profession to the wider community and specifically to young people to encourage first, uptake of further study in surveying, and then retention of graduates from TAFE and the universities in the profession. The Careers committee of ISNSW has been very active over the last 5 years trying to address issues such as work experience, attendance at careers markets, updating advertising materials and importantly supporting the Surveying Spectaculars (details below). Through all of these efforts the standard messages of an indoor/outdoor career, opportunities to work in a small firm or large consultancy, to work locally or travel internationally and to use high tech

instruments and powerful visual software have been consistent. This paper presents a more detailed account of the efforts taken to promote surveying in NSW.

2. WORK EXPERIENCE TO LOCAL HIGH SCHOOL STUDENTS

One of the best forms of promotion for the profession is work experience. Not only does the surveyor have something real to offer a young person, it is also a more amenable form of promotion for the surveyor who may not feel comfortable speaking to a room full of year 10 students. Most high school careers advisors try to arrange work experience for one week for year 10 students. Surveying, being a practical *profession* is particularly attractive especially with the opportunity for travel to a different site every day. However in recent years the regulations have become so cumbersome that many surveyors have stopped offering work experience. The Careers committee has tried to address this problem by providing links and information on the ISNSW website www.isansw.org.au/careers/work_experience to help members navigate the minefield of Occupational Health and Safety, Child Protection, Privacy, Equal Opportunity and Anti-Discrimination legislation.

The committee encourages surveyors to develop a relationship with their local school careers advisor and offer work experience possibly followed by a gap year of employment whereby the student would work at a surveying company for one year, straight out of school, and later consider further study at either TAFE or University. Conroy (2009) has explained an excellent model that he has used in his office for over 10 years with 12 students, many of whom have gone on to further study in surveying.

Work experience can however be counter productive if a company offers a work placement and is unprepared for the commitment to the student and instead gives a bad experience. This can be hugely destructive as the student will return to school and speak poorly of the surveying profession as well as potentially damaging the relationship between the careers advisor and the surveyor. To address this issue, the Careers committee have drafted a questionnaire (which is resident on the URL listed above) which requests the previous experience from surveyors but also asks questions to try and guide and ensure that the surveyor is prepared for a new work experience student. The questionnaire is listed in the appendix of this paper.

Work experience is an excellent method to encourage young people into the profession but it must be taken seriously and conducted professionally.

3. CAREERS MARKETS

In NSW, local Rotary clubs and clusters of careers advisor organizations in common geographical regions organise careers markets. These are designed to be “one stop shops” for predominantly year 10 and 11 students to consider the many career options available to them. Professional organizations, the tertiary education sector and trades provide booths and try to encourage young people to consider their future. These careers markets may attract up to 7000

students over (up to) two days and are held at locations all over Sydney and NSW. ISNSW have been attending these markets since 2004.

The ISNSW membership is well distributed across NSW and local coordinators volunteer themselves and their staff or colleagues to attend these markets. A large box has been purchased by ISNSW and contains banners, DVDs, posters and promotional brochures from the TAFEs and universities in NSW. The local coordinator receives the box by shipping, sets up the booth using some visual instructions in the box, attends the careers market and then packs up the box and ships it to the next destination. The careers market schedule is controlled centrally in Sydney by ISNSW staff and now and then the box returns for a refill of brochures and DVDs.

In 2009 ISNSW attended 14 careers markets across NSW. The record was 20 in 2007. One of the benefits of this model is that local surveyors can engage with their local community to encourage young people into their career. But it also gives professional surveyors a forum to promote their own profession where they may not have otherwise known how. It is not clear however how many students who show interest at careers markets then go on to become students at either TAFE or University. The Careers committee will be investigating ways to track students in future years.

Careers advisors also hold annual conferences and members of the ISNSW Careers committee recently attended as exhibitors. This seemed a very effective means of promoting the profession to the careers advisors who can then pass on this advice to suitable students. A group of careers advisors from NSW will be invited to attend the FIG2010 for a half day to see the exhibition hall and some presentations to help motivate and educate them of the role of the modern surveyor.

4. ADVERTISING MATERIALS

A very successful DVD was funded in a partnership arrangement between ISNSW and the ACS NSW in 2005. This DVD has been a core part of the advertising materials used to promote the profession for 5 years. It features a short 3 minute overview with upbeat music, fast changing images and no words. This is followed by 8 categories of speciality areas in surveying such as Land, Engineering, GPS, GIS etc and some 3 minute grabs of the best parts of surveying. Limited tracking of new students at UNSW has indicated that the DVD was the second most popular reason students chose to study surveying, behind word-of-mouth advice about the career.

The Careers committee engages a professional graphic designer for a range of different promotional materials such as the banners for the careers markets, posters, postcards and brochures. However this is a somewhat ad hoc process in that the overarching design of the ISNSW website and the advertising materials are not aligned.

Additionally the brochures from the two Universities and TAFEs use their own logos and design. There is a danger that there is too much information and it confuses the market.

5. SURVEYING SPECTACULARS

The idea of the Surveying Spectaculars (also called the Mathematics in Surveying Day) evolved from Careers committee member Ian Iredale and some of his colleagues who are practising or retired mathematics teachers. There is an increasing concern that young people are not choosing to study mathematics as it is perceived as difficult, irrelevant or boring. To address this issue Ian formed his own committee who set about developing a series of surveying activities for year 10 Advanced Mathematics students (about 15 years old). The first Surveying Spectacular occurred in August 2008. 180 school students and 45 surveyors engaged themselves in a day of surveying activities, including mapping, remote heighting, calculating the circumference of the Earth and setting out a pattern (see Appendix 2 for an example exercise). This has been followed up with two further spectaculars in 2009, the first with 210 students and the second with 65 students (this was rescheduled due to a washout and it was difficult to find a time that suited the schools). Two further spectaculars are planned for 2010.

The committee currently consists of three surveyors and four teachers. Five of these are females and three are retired. The balance of the committee is important. The teachers have a good understanding of the most appropriate students to target, the best time of the year to run the spectaculars, have contacts with the professional Mathematics Association who support and promote our spectaculars, are best able to prepare the students' worksheets and invite student teachers to volunteer in running the day. The surveyor's role is to book the venue, organise the volunteer surveyors required, organise the activities and the survey equipment required, provide the meals to the volunteers and arrange publicity. Next year the committee will attempt to obtain government funding to help present a more professional event.

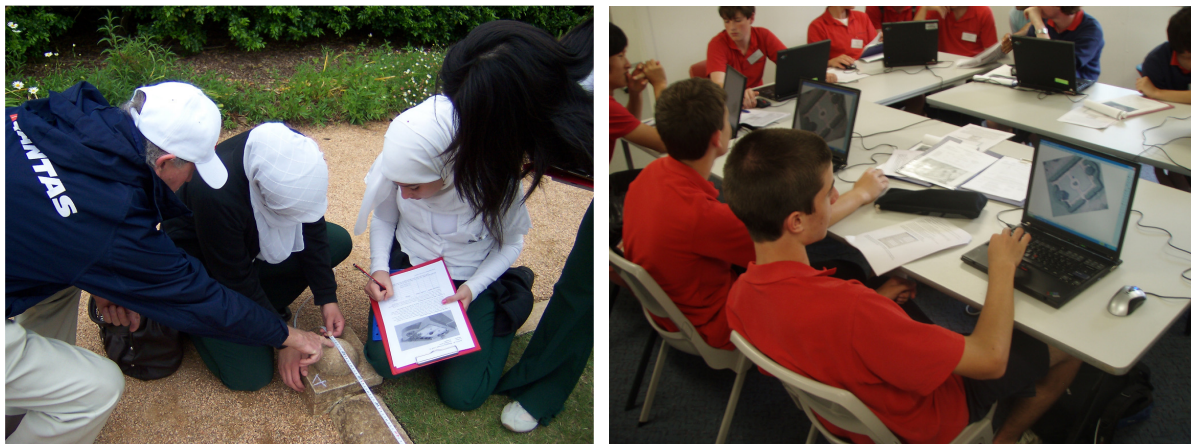


Figure 1 – Students at the Surveying Spectaculars are involved in field mapping followed by CAD drawing in the office. Encouraging and helpful supervision at all times ensures the students come away with a positive experience.

To date, attendance at a Surveying Spectacular has attracted 4 Survey Continuing Professional Development (CPD) points. 15 CPD points are required annually to maintain registration in NSW as a Surveyor. 1 CPD point represents 1 hour of professional development. Most

commonly these points are earned at seminars or conferences, where the surveyor or their firm, pay a fee to attend. The Surveying Spectaculars are promoted as a novel way to earn CPD points, in the surveyor's natural habitat (the field) for no outlay of cash with a free lunch thrown in! To date the surveying profession has been very supportive and it has been easy to find enough volunteers. The ISNSW CPD sub committee has recently determined that the professional development component for the spectaculars is only worth 2 points, so recruitment may become more of an issue from now on.

The profile of a volunteer, is a middle to older aged male surveyor, many of whom are retired. Consequently the committee are now working on ways to attract younger surveyors, especially females. Some options are to offer conference discounts to survey firms who allow their younger staff to attend, or to make it a compulsory part of the student's requirements for a diploma, degree or registration as a surveyor.



Figure 2 – Students at the Surveying Spectacular use modern instruments and receive enthusiastic and engaging instruction from presenters (in this case Technical Program Director of the FIG2010 Associate Professor Bill Kearsley reaching for the Sun).

An added benefit of getting surveyors to attend the spectacular, is that it teaches them about how to promote to younger people and hopefully engages them more with the profession so that they may evolve into future committee members or even presidents.

The Surveying Spectaculars have been documented in Azimuth, the ISNSW monthly newsletter. Those articles have attracted interest from surveyors and teachers in Victoria,

South Australia and Western Australia, who also are likely to run spectaculars in the future. The Hunter Manning group of surveyors (a sub group of ISNSW) invited the committee to present at one of their dinner meetings and they successfully ran their first spectacular in 2009. One of the benefits of many groups running spectaculars is that the best features of one group's spectacular can be adopted by other groups to continually improve all the spectaculars.

The students are all provided with name badges, which allows ISNSW to obtain a list of the names and schools. This list will be cross matched against those entering TAFE / University to monitor the effectiveness of these events. During the two years after the students have attended a Spectacular, they have to think about their choice of career and make decisions about which tertiary course to apply for. Those schools are targeted during this period to have a surveyor attend their careers days to improve the chance of them choosing surveying as a career.

The spectaculars are also a very good public relations exercise. Most PR people have indicated that the story is of most interest to the education and careers sections of the major Sydney newspapers. They do not believe that it will attract the TV news sections. We also target a schools local newspaper and the local newspaper for Bicentennial Park, Homebush Bay where the Survey Spectacular is held. It is important that school students are warned that they may be photographed or videoed and we ask that parents specifically provide us with written notice if they do not wish their child to be involved in publicity. To date we have not received a letter.

The spectaculars provide a win for everyone - teachers, students, surveyors, education faculties and surveying institutions. Many mathematics teachers mention to us that it is the first excursion they have been on in their career. Mathematics students are either classroom bound or at best allowed into a computer laboratory. Students struggle to appreciate the relevance of mathematics and the spectaculars provide them with a practical application for what they have learnt. The students derive pleasure from 'playing' with our high tech 'toys'. Surveyors really enjoy demonstrating the tools of their profession to the students and at the end of the day they are happy to have been able to assist the students to learn. There are obvious benefits for the education faculties, although it is too early to measure how successful the spectaculars are. The surveying institutions also benefit from the promotion of the profession and there are few better PR exercises available.

The role of the surveyor is often misunderstood. Students commonly mistake a total station for a movie camera, but by the end of the Surveying Spectacular, every one of them will have looked through a telescope, booked a horizontal and zenith angle and measured a slope distance. So if by some stroke of misfortune, no students are attracted to our wonderful profession, at the very least those students will better appreciate the role of surveyors in the wider community.

6. MEDIA AND PR

In the past, the Careers committee has allocated some of its budget to media professionals on a part time basis to seek out opportunities in the print media to promote the profession to the wider community. The role of the media professional is to use their contacts to get the story published. This has had limited success with an often fickle media cycle and no way of measuring the impact of a well written story with a bright picture. However as with all marketing efforts, doing nothing would be much worse.

Often articles specific to the careers section of a newspaper are the most successful and usually feature a young student or recent graduate and an outdoor picture with a surveying instrument.

Sometimes a short media article has been placed in a regional paper shortly before a careers market to help generate some interest. Often it is easier to get a story in a regional paper and it may also be without cost. The stories are often pitched at the parents or grandparents as younger people rarely read the local paper.

The Careers committee has also had some success with some short video features on careers websites such as the ABC Ace Day Jobs (2007). Members of the profession are also infrequently heard on the radio on a particular a show called “Australia all-over” which is broadcast nationally on ABC radio on Sunday mornings and has a wide following. Again this style of show appeals to parents and grandparents who influence the decisions for their children.

Increasingly the committee is realising the importance of the internet and making concise material available to potential new students and members of the profession online.

7. TARGETING THE SCOUT ASSOCIATION

The Careers committee recognises that the type of young people attracted to scouting are more likely to be interested in a career in surveying. Scouting attracts young people with a love for the outdoors, map reading, navigation and problem solving, all requisite skills for a career in surveying. At present only limited approaches to the scout association have been made. The Careers committee hope to coordinate some hands on activities at large scouting events such as Jamborees (for Scouts aged 11- 14) or the annual “Easter Dragonskin” (for Venturers aged 14 – 17yrs). The largest obstacle for engaging in these activities is having the resources (ie surveyors able to volunteer some time) and the regulations imposed by the scout association with regard to Occupational Health and Safety and Child Protection Legislation.

8. INPUT INTO THE MATHEMATICS CURRICULUM

The careers committee has worked with the NSW Department of Education to try to include surveying examples into the high school mathematics curriculum. Some progress was made in

this direction until the federal government decided to impose a new national mathematics curriculum which rendered the previous NSW based work redundant. The careers committee has registered an interest to engage with the national mathematics curriculum but no further progress can be reported at this time.

Pupedis & Bellman (2009) highlight a growing problem in Victoria whereby the number of students choosing to study mathematics at a level that allows direct entry into surveying programs is declining. This trend is mirrored in NSW with the additional problem that a subject called Mathematics Extension 1 is recommended for entry into surveying programs in NSW. Final year (year 12) high school students who want to study at university achieve an ATAR score (Australian Tertiary Admissions Rank). In order to achieve this they need to study at least 10 units. All subjects are valued at 2 units except Mathematics Extension 1 which is the equivalent of 3 units, meaning that a student must complete 11 not 10 units to achieve an ATAR score. This is a disincentive for students who must decide in year 10 whether or not to tackle this added unit and therefore reduces the pool of potential university applicants.

8.1 Providing Surveying Materials for Mathematics Textbooks

The careers committee have also worked with the author of a widely used mathematics text book. Some surveying exercises dealing with geometry and demonstrating GPS and a number of images to illustrate the book were provided to the author, however since the move to the new national mathematics curriculum, it is unclear whether this book will need to be rewritten to comply with the proposed new curriculum.

9. A LIFE WITHOUT LIMITS CAMPAIGN

Since submitting this abstract for the FIG conference, the “A Life without Limits campaign” (ALWL) has gained some prominence in NSW. The ALWL campaign was an initiative of the Surveying Industry Task Force which combined members from the Surveyors Registration Board of Victoria, the Consulting Surveyors Victoria, the Institution of Surveyors Victoria (ISVIC), Spatial Sciences Institute (now the Surveying & Spatial Sciences Institute), the tertiary education sector, and various members from the government and private sector in surveying and spatial information, who recognised the need to promote surveying in their state (Pupedis & Bellman 2009). The Task Force raised significant funding and engaged marketing consultants to conduct a professional marketing campaign. This is the first time in Australia that in-depth market research with target groups, questionnaires and psychological modelling was used to examine what surveying and spatial information is and how it should be most effectively promoted. The result was the “A Life without Limits” campaign and website: www.alifewithoutlimits.com.au . The campaign will use this site as a home base to offer advice on what surveying is, where to study, job opportunities and links. The front page features a 7 minute video which is a “day in the life” of a surveyor. This video attempts to explain what a surveyor does and answer some questions as it runs.

The campaign has engaged with schools and receives a large number of hits from interested potential students. Rather than “reinvent the wheel” ISNSW have decided to work with the ALWL team and create some NSW content for this website and promote it in NSW. South Australia has also engaged with the ALWL campaign. This has the advantage of not confusing the market (mainly surveying) with too much information and still providing appropriate links for more detailed information on a particular topic of interest.

Concurrently a new website which seems to target more the Spatial Information specialist has been developed in Queensland. It is called “Destination Spatial” www.destinationsspatial.org . The newly formed Surveying and Spatial Sciences Institute (SSSI) will adopt this website as their promotional website. Links are provided to the ALWL website but again this highlights the problem in Australia with different organisations promoting the same outcome with different messages which potentially confuses the market and discourages uptake of new members.

Further, for the potential new student the two organisations of the ISNSW and SSSI which both contain the word “surveying” send a very confusing message and portray our profession as divided and unharmonious. This situation needs to be addressed for our own promotions as much as for the efficacy of such a small niche profession (Diacono, 2009).

CONCLUDING REMARKS

The surveying profession is a small, niche profession and its role is not well understood in the wider community. Therefore promotion of surveying can never stop. In NSW, the careers sub-committee of the Institution of Surveyors NSW have been very active in trying to reach out to a wider audience and encourage a greater uptake of students to study surveying at a technician or professional level. Much of this activity has occurred in a spasmodic or opportunistic fashion. The Victorian “A Life without Limits” initiative has adopted a much more structured campaign and in recent times NSW and SA have combined their efforts to deliver a more consistent message promoting surveying.

Some of the good work conducted in NSW will be adapted into the ALWL campaign and NSW will benefit from a modern website which will evolve into a focal point for all marketing activity in surveying.

The success of the Surveying Spectaculars in Sydney has migrated to a local group near Newcastle in NSW who have successfully run their own version of the event. Local groups in VIC, SA and WA will follow a similar approach and develop the model further. Feedback from the four spectaculars already conducted have been overwhelmingly positive but it is still too early to gauge if this success translates into an increased number of new students.

In 2010, TAFE in Wollongong will run a distance learning course for surveying at a technical level to cater for the many students in remote or regional locations who cannot travel to an institution only offering face-to-face education.

All of this activity is important and positive however the recent “Destination Spatial ” initiative in Queensland “muddies the waters” somewhat. If the Institution of Surveyors, Victoria (ISVIC), ISNSW and SSSI (SA) are all supporting the ALWL campaign and the SSSI (QLD) propose to run a national campaign to promote the profession then who actually is running the national campaign? If this is confusing for the authors of this paper, then what image is being projected to the wider community? Many issues of identity arise from this schism that simply must be solved at a national level through the new SSSI in order to preserve a clear message and allow effective promotion of surveying and spatial information.

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APPENDIX 1 – Work Experience questionnaire

Work Experience Questionnaire (www.isansw.org.au/careers/work_experience)

The following questionnaire is designed to harvest information from members who have already offered work experience to high school students as a means of promoting our profession. Responses from this questionnaire will be fed back to all ISNSW members in an effort to ensure that students are enjoying good work experience and will be encouraged to undertake further study and ultimately become members of the profession. Hints and tips for all members will also be gathered and fed back as part of this exercise.

How big is your business (ie how many staff)?

What type of work do you offer your clients?

Do you regularly offer work experience to local high school students? If yes, how often and which year (ie year 10 students)? If no, why not?

If you have *not* offered work experience, what would encourage you to do so in the future?
.....

If you have offered work experience, how do you find students? Do they come to you (if so how do they find your business), or do you visit a local school careers advisor and ask for a suitable student? Any other means of attracting students?

What tasks and activities do you plan for a new work experience student? Give examples.

Does your business have promotional materials (ie brochures, DVD) available for work experience students upon completion of their placement, or in prominent view at your reception desk?

Do you seek feedback from the student or their school after completion of your work experience placement? If so, how?

Do you keep in contact with a student after a mutually positive experience in the hope of offering employment, or encouraging further study in the future?

Any other comments you would like to make regarding work experience?

Thank you for your time filling out this questionnaire. ISNSW believe that work experience is a very effective way of introducing our profession to the community and hopefully encouraging high school students to consider a career in Surveying and Spatial Information. Your experiences are valuable to help promote our profession.

This has been an initiative of the Careers sub-committee of ISNSW.

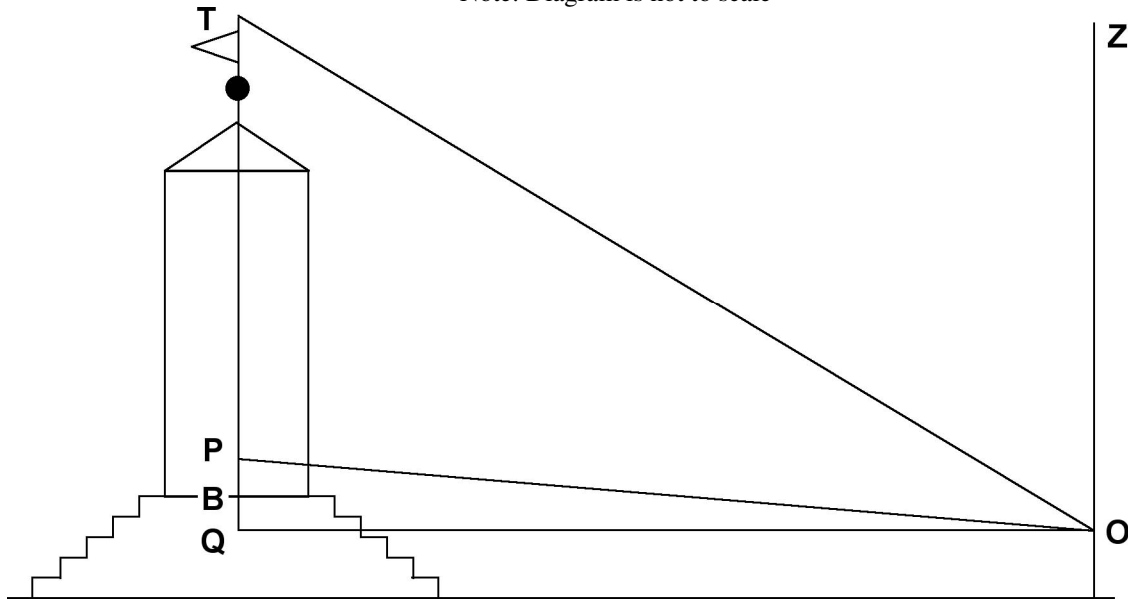
APPENDIX 2 – Example worksheet from Surveying Spectacular

Activity A: Height of Treillage Tower

Location: Near the end of the path leading to the Treillage Tower
Duration: 30 minutes

Task: Find the height of the tip of the mast at the top of the tower above the base level, that is, the height TB in the diagram.

Note: Diagram is not to scale



In the diagram: O is the position of the observer's eye.
 Z is a point vertically above O (called the zenith point)
 P is the prism
 T is the tip of the mast on the Treillage tower
 B is a point vertically below T on the base level of the tower
 Q is a point vertically below T on the same horizontal level as O

Before you make any measurements, test your estimation skill by estimating the height of the tower, from the very top to the floor level (the top of the concrete steps).

I estimate the height of the tower to be metres

Given information: Height of prism above the base level of the tower: PB = _____ metres

Observations: Zenith angle of top of tower: _____ (Angle ZOT)

_____ Zenith angle of prism: _____ (Angle ZOP)

_____ Slope distance to prism: _____ OP

Calculations: Look first at triangle POQ
 What is the length of OP? _____
 What is the size of angle POQ? _____

Use this to work out the length of OQ _____
Use this to work out the length of PQ _____

Now look at triangle TOQ
What is the size of angle TOQ? _____
Use this to work out the length of TQ _____

Now find the height of the tower TB _____

BIOGRAPHICAL NOTES

Craig Roberts is a Senior Lecturer in Surveying/ GPS/ Geodesy at the University of New South Wales, Sydney, Australia. He has lectured at RMIT University in Melbourne for two years. He graduated from the University of South Australia with a Bachelor of Surveying in 1988. He began his career as a private surveyor in Adelaide and has since worked as a Geodetic Engineer at UNAVCO, USA involved with GPS for geodynamic studies in Nepal, Ethiopia, Argentina and Indonesia. He worked as a scientific assistant at the GeoForschungsZentrum, Germany where his main focus was orbit determination and prediction for a number of geodetic research satellites. He completed his PhD thesis in March 2002 supervised by Prof. Chris Rizos. His current research interests involve leveraging CORS infrastructure for practical application to surveying and spatial information.

Ian Iredale is a director of Iredale and Associates, a land surveying business and Mapsoft, which develops miniCAD survey software for the PC and PDA's. He graduated from UNSW in 1981 with a Bachelor of Surveying (Hons) and completed a Diploma in Computing at Macquarie University in 1988. He began his career as a cadet surveyor with Sydney Water in 1976 working mostly in the cadastral and geodetic sections. He started his own business in 1994 and has enjoyed immeasurably his career as a surveyor.

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