THE IMPORTANCE OF EDUCATION AND TRAINING IN FLEXIBLE BLOCK PAVEMENTS

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SUMMARY

Education and training in all disciplines is essential in today's world of high expectations and standards. The majority of papers presented regarding flexible block paving discuss research into the vital aspects of engineering design and specifications, along with product and material testing to determine performance and longevity of pavements. This research is based on the assumption that the pavement will be constructed correctly to the design and specification criteria.

It can be argued that work practices and specifications are two separate issues. No matter how high the quality of the specifications is, the final product is only as good as the skills of those charged with constructing it. It is important that installers/contractors understand why specific tasks, tolerances and laying criteria must be adhered to. Contractors must also be cognisant of the consequences to the end result if these principles are not observed.

Since 1988 Holmesglen Institute of Technical and Further Education (TAFE) in Melbourne, Victoria (Australia) has been a world leader in the education and training of installers, supervisors and paving contractors of rigid and flexible segmental and flag pavements. Holmesglen Institute of TAFE was one of the first educational organizations to develop a training program specific to rigid and segmental and flag pavements. This was done in conjunction with the Concrete and Clay Manufacturers and Paving Industry.

The Institute has been involved in conducting a biannual Paving Conference, training programs for overseas visitors, and seminars and training programs in Japan. The purpose of my presentation is to illustrate the benefits that can be achieved by training and educating those installing block pavements in the correct methods of construction.

1. INTRODUCTION

1.1 Overview

The emphasis of the International Conferences on Concrete Block Paving (CBP) has been on specification of products, varying methods of construction and testing procedures. While these are essential features of quality CBP, if pavements are to perform adequately over their life expectancy of 25-30 years, sufficient consideration must be given to the construction, supervision and maintenance of the pavement. My contention is that the people in charge of the construction of CBP are, to a large degree, responsible for the overall quality of the pavement. Therefore those who are laying the pavers (manually or mechanically) must be trained and educated in all aspects of CBP, to enable them to complete the construction to the highest possible standard.

1.2 Rationale for Education and Training Program

In the construction of pavement, as with any field of practice, those performing the task are issued with the responsibility of ensuring that the task is completed;

a. To the specified standards and,
b. Within a reasonable timeframe.

The experiences of the Holmesglen Institute of TAFE during the first 5-10 years of implementation of the Segmental Paviors Training Program illustrated that while there were installers who were able to achieve these outcomes, there were also many who did not have these capabilities. During these years approximately 80% of students in the night class courses were existing contractors who whose work practices and skills benefited greatly from the relevant, comprehensive and achievable education and training program. As the course has been running for over 15 years this trend has subsided, with the majority of students now doing the course within an overall apprenticeship training program.

1.3 Benefits of Education and Training

Benefits of the training program for existing contractors, students and others in the industry include;

- An improvement in the standard of work, particularly in regards to attention to detail, which contributes to the overall quality of the completed work
- Education and training encourage longer term commitment to the industry, thereby reducing staff turnover.
- Enhanced career opportunities, clearer career paths and advancements in the industry
- Improved job satisfaction with a better understanding of paver systems
- Increased productivity and efficiency resulting in increased profits
- Staff are more equipped to make appropriate construction decisions
- Senior staff are better equipped to train others e.g. apprentices and trainees
- Communication between specifiers and contractors is improved due to an increased understanding of pavement systems

2. STAGES OF EDUCATION AND TRAINING PROGRAMS

2.1 Needs Analysis

Before developing any new educational or training program it is essential to establish and define a need for the program. The training program developed by the Holmesglen Institute of TAFE in 1988 was established in response to the articulation of a need by members of the paving industry in Victoria, such as the Landscape Industries Association of Victoria (LIAV, whose members are responsible for the majority of paving construction in Melbourne), the Clay Brick and Paver Association of Victoria and the Concrete Masonry Association of Australia. This need was precipitated by significant increase, at that time, in the demand for flexible concrete and clay segmental paving. This increase in demand resulted in a relative shortage paving contractors, which led to a considerable decrease in the standards of work as contractors without the appropriate expertise began laying paving.

The associations identified the need for the training of contractors and their staff, as well as other persons working within the paving industry, such as manufacturer sales representatives, vocational teachers, and suppliers of associated materials (sand, stone, etc.). Holmesglen Institute of TAFE was approached to develop a course on the correct installation of flexible clay and concrete segmental paving.

2.2 Consultation and Development

To ensure the needs of all concerned parties were met the Segmental Paviours Training Program Consultative Committee was established as an ongoing consultation and development group. This group was comprised of manufacturer representatives (both concrete and clay), contractors (LIAV representatives), an independent paving consultant, an educational technologist and an educational trainer with practical paving experience, with the opportunity to consult additional experts when necessary, and continues to meet three times per year. In consultation with the committee, Holmesglen Institute of TAFE developed a draft curriculum using existing educational models. This was extensively reviewed and eventually became the 'Segmental Paviors Training Program' which has been continuously conducted at the Holmesglen Institute of TAFE since 1989.

2.3 Implementation

Prior to accepting the first group of students a pilot program was conducted. The members of consultative committee and several contractors with established expertise and exemplary work practices participated as 'students'. The pilot program enabled any faults or problematic areas to be identified and eliminated, and gave teaching staff the opportunity to assess the course content, delivery, duration and assessment procedures and criteria. The pilot program also provided the opportunity for Holmesglen to demonstrate to the industry that the training program is well structured, relevant, topical and of value to contractors and their staff.

The program has been running successfully since 1989, with the duration of the course varying with the student demographics. The course can be completed in 47 hours over an 11 week night course program, or within an apprenticeship program lasting up to 64 hours.

2.4 Training program target group

The program is targeted at all persons involved with the flexible paving industry. Previous participants have proceeded to become extremely successful contractors and upper management personnel, including CEO's of major manufacturers.

The program can be modified to facilitate differing target groups. Some examples of modifications include;

- In-service programs for manufacturers conducted over 2 days.
- One week programs run in regional areas
- Three day programs for visitors from Asian areas
- Modified version run in Japan by an Australian teacher

2.5 Evaluation and Review

All participating in the training program are requested to provide an evaluation of the program. This is facilitated through both informal conversation with teaching staff, and a standardised evaluation form, with options for further comments. All evaluation is collated and fed back to the consultative committee.

The training program continues to be overseen by the Segmental Paviors Training Program Consultative Committee, which meets three times yearly to discuss curriculum content, evaluations, potential amendments to the programs and other issues concerning the paving industry which may be of relevance to the program. This ongoing review and improvement process ensures that the program remains relevant to all facets of the industry, and that the students learning and competence is

maximised. The teachers delivering the program are directly accountable to the committee, ensuring that the teachers remain active participants in the ongoing program delivery and reducing the risk of teacher complacency.

3. CURRICULUM OVERVIEW- SEGMENTAL PAVIORS TRAINING PROGRAM

3.1 Key features

The following are key features of the program;

1. Relevance- through regular contact with manufacturers and contractors the committee ensures the program remains in touch with the current demands, trends and new developments within the industry such as permeable paving, flag paving, and the re-emergence of stone pavers.
2. Flexibility- the program's curriculum is structured to allow changes to be made in accordance with the new developments in the industry as mentioned above. The program also allows contractors with particular expertise to be exempt from that component of the course. Students are able to repeat or make up missed units in subsequent programs.
3. Practicality- the program encompasses theoretical knowledge necessary to ensure an adequate understanding of pavement systems, combined with a large practical component with student participation and expert demonstrations
4. Accessibility- there are no pre-requisites for enrolment, resulting in a mixed classes of experienced contractors and inexperienced students. This combination of students allows the experienced contractors to share their prior knowledge with the less experienced students. Established contractors also learn techniques from each other and the educators which they have not previously been exposed to.
5. Achievability- as the course is also run as a night education program it is possible for students who are employed full time to complete the course in the allocated time period without compromising other aspects of their employment in order to attend.

3.2 Content

The training program has continued to evolve since its inception in 1988. The current curriculum comprises of the following units.

1. Introduction
   Orientates the student to the program and outlines the course structure, content, assessment procedure and attendance requirements
2. Occupational Health and Safety (OH&S)
   Highlights the OH&S regulations and the necessity for contractor diligence with regard to OH&S issues, with particular reference to;
   - Hearing protection and associated equipment
   - Sun exposure, UV protection and early signs of skin cancer
   - The prevention of back and other injuries through correct lifting techniques
3. Paver Characteristics
   Introduces the student to the manufacturing and processing procedures of clay, concrete and stone paving slabs. Various tests performed on pavers are demonstrated to the students. This knowledge can assist in the understanding of the probable manufacturing tolerances in terms of size and colour.
4. Paving Terminology
   Introduces the student to the correct terminology associated with, and used in the paving industry.

5. Setting out and preparation of paving areas
   Provides theoretical teaching and demonstrates the practical skills regarding minimum and maximum gradients, and the ability to competently set out paving areas.
6. Calculation of Paving Materials
   Teaches students to accurately calculate the correct quantity of required paving materials, including compaction rates and tolerances
7. Pavement Design
   Teaches students about the structural component of flexible pavement, including sub-grade strength, CBR, crushed rock testing and compaction rates and densities.
8. Bedding Materials
   Teaches the function and characteristics of the bedding materials, and highlights the necessity for consistent thickness and the consequences of ignoring these tolerances.
9. Installation Techniques
   Demonstrates techniques in screeding and the setting up of string lines to ensure the paving remains straight.
10. Cutting Techniques
    Students are instructed in the operation of cutting equipment, particularly the use of diamond blade brick saws.
11. Joint Filling
    Illustrates the techniques used to thoroughly fill joints, and emphasises the absolute necessity successful completion of joint filling. This unit includes post-laying compaction using a vibrating plate.
12. Edge Restraint
    Educates students regarding the various types of traffic which use pavements and the pressure this traffic load may have on the edge restraint.
13. Maintenance and Stain Removal
    Illustrates to students the maintenance procedures which are necessary to ensure that the paving remains serviceable and safe throughout its life span. Students are educated in techniques used in the removal of common stains which affect concrete, clay and stone paved areas.
14. Assessment
    Students are required to undertake a written examination upon completion of the training program. Practical skills are assessed throughout the course. A written assignment on paving techniques completes the assessment of the course.

3.4 Accreditation

In conjunction with the Landscape Industries Association of Victoria, the Clay Brick and Paver Association of Victoria and the Concrete Masonry Association of Australia, Holmesglen Institute of TAFE created a process whereby contractors can become an ‘Accredited Paving Contractor’. In order for a contractor to obtain accreditation he/she must complete the following process;

1. Complete the Holmesglen training program or a course of study which includes the equivalent content
2. Complete a comprehensive written application
3. Provide proof of a minimum of two years industrial experience
4. Sit an interview with a nominated panel of experts
5. Provide three completed paving jobs to be inspected

If a contractor is successful they are placed on the register of Accredited Paving Contractors. This register is updated annually, and available from the paving manufacturers, Holmesglen Institute of TAFE and the Landscape Industries Association of Victoria.

3.5 Alternative methods of education

This paper has concentrated on the design and implementation of an extended training program, however there are many other forms of continuing education for contractors and others within the industry. Holmesglen Institute of TAFE is committed to education in the area of segmental paving, and over the years has offered numerous other educational opportunities, such as;

- Conferences
- Seminars
- Workshops
- Single issue lectures
- Trade displays
- Practical demonstrations of new products

4. CONCLUSIONS

A comprehensive and dynamic training and education program is an essential component of an industry which is striving for continuous improvement at all levels. Considering the current technological and environmental changes taking place within the industry e.g. computerised laying equipment and sustainable pavement systems, the industry will not continue to survive and prosper without ensuring that those involved in the industry at every level, are adequately trained and educated.

5. REFERENCES

Clay Pavior Training Program Curriculum Document, 1988, Nicolaas van Diemen and Ian Randall Holmesglen Institute of TAFE.