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**Assessment of training courses for asbestos
removal workers**

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EXECUTIVE SUMMARY

Objectives

The aim of the project was to review and assess current training provision for asbestos removal workers against the current guidelines and regulations. This was accomplished by attending six initial training courses for asbestos operatives (including an in-house training provider course) and one for asbestos supervisors.

The objectives were to:

- ascertain whether current standard of training are complying with Regulation 9 of the CAWR amended in 2002, the training chapter of Asbestos: The Licensed Contractors' Guide (HSG247) (HSE 2006) and with the updated EU directive (2003) amending council directive 83/477/EEC on the protection of workers against risks from exposure to asbestos;
- make recommendations where training could be strengthened;
- provide feedback to the Asbestos Licensing Unit (ALU) and the Asbestos Training Providers' Working Group (ATPWG) on the current standard of training.
- provide a benchmark for HSE and trainers for good practice.

Main Findings

1. New Operatives Courses

Six asbestos-removal training courses for new operatives, including an in-house training provider course were attended. Major improvements, compared to previous experience, were found in the training of new asbestos removal operatives with the implementation of the three day course and of the chapter 4 of the Licensed Contractors' Guide.

All tutors had good knowledge, personal practical experience in the asbestos industry, demonstrated enthusiasm about the subject and established a good rapport with trainees.

In general, the three days new operative training courses were very intensive since a lot of information had to be delivered in a short period of time.

All courses were role specific and usually complied with the tutor to delegate ratios (1 tutor for 12 delegates during the theory based sessions and 1 tutor for 6 delegates during the practical sessions).

The course duration (excluding written test assessment time and break) varied from 14 hours to 22 hours and five of the six training providers did not fully comply with the minimum of 18 hours of training.

The courses were delivered using a variety of teaching methods. On average, lecture was the predominant method (about 7 hours) followed by teaching through practical sessions (6 hours), demonstration (1 hour 30 minutes), classroom exercises (about 1 hour) and projection of a video (45 minutes). Some of the practical session time accounted for waiting time (e.g. in general trainees waited while their colleagues individually practised the transit and decontamination

procedures). If this waiting time were not accounted for, few courses would comply with the 6 hours minimum practical hand on sessions.

Lecture

Training providers provided a lot of information through lecturing and these three days new operatives courses included very long intensive periods of lecturing. The courses usually included limited opportunities for group discussion.

The time spent on average on each of the main modules varied from 70 minutes (site set and dismantling) to 15 minutes on waste management and disposal.

Audiovisual aids

The videos used during the training course of new operatives generally focused on the uses and health effects of asbestos, where asbestos can be found and regulations. Very few commercially available videos if any cover technical aspects of site work such as the use and maintenance of RPE, the use of controlled stripping techniques, decontamination procedures, the bagging and removal of waste from enclosures.

Classroom paper exercises

In general, TPs included a very limited number of questions or problem solving exercises to the new operatives courses.

Practical and demonstration sessions:

The time allocated to the practical sessions varied from 2 hours 40 minutes to 10 hours 25 minutes.

On average, tutors dedicated 3 hours 15 (53%) minutes to the practical sessions on the construction of enclosure and airlocks compared to 2 hours 15 minutes (38%) on transit procedures and decontamination, 25 minutes (6%) on maintenance of RPE and 10 minutes (3%) on controlled stripping techniques.

The time assigned to the practical sessions on transit procedures and decontamination varied amongst training providers. All courses included individual practical sessions on transit procedures and decontamination lasting from 7 to 35 minutes per trainee with a number of trainees per session varying from 5 to 9. However, all trainees did not have the opportunity to practise the full transit and decontamination procedures. In general, each trainee waited while his colleagues practiced the procedures. An important part of the 2 hours 15 minutes accounted for waiting time.

In general, the important topic on the use of controlled stripping techniques was mainly delivered through lecturing using power-point presentation.

Few tutors included individual practical sessions on the maintenance of RPE and on controlled stripping techniques, resulting in a low average time assigned to these activities.

The time dedicated to the demonstration sessions on the maintenance of RPE and on controlled stripping techniques was 45 minutes and 25 minutes respectively.

No training provider included a demonstration or practical session on the bagging of waste and the removal of waste bags through the bag-locks. These procedures were only briefly explained during the lectures using power-point slides.

Overall core topics

Five of the six training providers' tutors had consulted the chapter 4 of the Licensed Contractors' Guide and were aware of its contents and requirements and covered in more or less depth and detail the core topics listed in chapter 4 of the Licensed Contractors' Guide.

Due to a lack of teaching materials and the limited amount of time after the lecturing and the running of the practical sessions, the topic on "fault finding" was generally superficially covered.

2. New Supervisors Courses

These results are based on a single new supervisors course and may not be representative.

The course duration was approximately 11 hours (excluding written test assessment time and breaks) and did not comply with the minimum of 18 hours of training.

The tutor dedicated a very limited amount of time for demonstration session (5 minutes) and classroom or group exercises (20 minutes). The course did not include videos to illustrate or reinforce the teaching of the training. The course did not include fault finding exercises or problem-solving activities and allowed limited opportunities for group discussion.

It seemed that the tutor assumed that the new supervisors had already acquired most of the core topics for new operatives listed in the Chapter 4 of the Licensed Contractors' Guide. This course could best be described as a diluted course for new operatives with limited additional knowledge relevant to the supervisors.

Lecture

The lecturing of most of the topics did not exceed 20 minutes with some essential core topics and modules more relevant to new supervisors being superficially covered. The tutor did not lecture on module 19 (information, instruction and training) and on faults findings.

Practical and demonstration sessions

The duration of the practical sessions was 3 hours 35 minutes including waiting time during individual practice of the transit and decontamination procedures. This course did not comply with the minimum 6 hours practical session.

Each trainee had the opportunity to practice the transit and decontamination procedures including personal decontamination. The duration of practice per trainee varied between 20 and 30 minutes. However, the tutor did not assess the trainees' ability to carry out the procedures on their own. The trainees did not set-up the hygiene facility.

The tutor did not include essential practical sessions on the maintenance of a range of full-face masks, which would enable supervisors to fulfil this important role once on asbestos removal site.

All three trainees actively participated to the task on the sheeting of an enclosure and the attachment of pre-built airlocks and NPU (2 hours 15 minutes) during the practical session on the construction of enclosure and airlocks.

This course did not include demonstration or practical session on controlled stripping techniques and waste bagging and disposal.

3. Assessment

All tutors assessed the trainees' attainment level using a multiple choice questionnaire type exam and some tutors also included a written assessment exercise on transit and decontamination procedures.

In general, the candidates did not refer to their training manual to complete the multiple choice questionnaire type exams. However, some TPs allowed them to use their notes.

The trainees were sometimes left unattended during the written tests assessments and on some occasions trainees exchanged answers or copied the transit and decontamination procedures listed on their notes directly into their assessment exercise.

Some tutors assessed and recorded the performance and attainment levels of trainees during the practical sessions as well as assigned a pass or fail mark for each practical sessions.

The written assessments alone cannot provide a full picture and an objective judgement on the trainee's attainment level.

In general, the tutors would give a pass mark to the multiple choice questionnaires type assessment if a trainee achieved 75% or more.

During the seven courses attended by a member of the Inorganics & Fibres section, no trainees failed the course.

Recommendations

Recommendations for new operatives and new supervisors courses

- The new operatives and supervisors courses should deliver all practical modules and core topics listed in chapter 4 of the Licensed Contractors' Guide.
- Means to reduce waiting time for trainees during individual practical session and assessment should be sought.
- The course would benefit from a longer time period of teaching (4 days) allowing more time for practical sessions, demonstrations and classroom exercises or group discussion as well as bringing a less intensive period of lecturing.
- Courses and trainees' learning would highly benefit from a video on: decontamination procedures; waste bagging and removal procedures; on-site controlled stripping techniques (e.g. wrap and cut and multipoint injection equipment for pipe lagging, removal of AIB ceiling tiles); maintenance of equipment (e.g. multipoint injection system, negative pressure unit, H type vacuum cleaner); bad practices. Videos showing bad practices can be a good medium to encourage trainees to think actively and engage discussion.
- Trainees should be fit tested and assigned with a full-face respirator before attending the three day course.

- In addition to the practical session on the construction of enclosure and airlocks, the course should include a demonstration on H type vacuum cleaners and negative pressure unit by showing and explaining the different components and accessories.
- During the practical session on decontamination and transit procedures:
 - Tutors should demonstrate how to correctly wear respiratory protective equipment (RPE) and protective personal equipment (PPE) (e.g. full-face RPE, coverall, boots) and how to remove coveralls at the end of the shift.
 - Tutors should demonstrate how to carry out personal pre-decontamination vacuum procedures.
 - The hygiene unit should be fully operational (powered and connected to water) and trainees should have the opportunity to set-up the hygiene unit (especially the trainees attending new supervisors courses).
 - The three stage airlocks and the hygiene facility should be equipped with all necessary items (e.g. waste bags, powered vacuum cleaners, buckets filled with water and sponges, disposable towels, nailbrushes etc...).
 - Trainees should not transit with their own shoes and should be provided with impervious shoes.
 - Each trainee should have the opportunity to practise the full procedures (including practising the transit procedures and the full decontamination in the airlocks and the hygiene facility) on an individual basis and the duration of the practice should be at least 30 minutes.
 - Trainees should be allowed sufficient time to practise pre-decontamination procedures in the airlocks and to shower in order to install good practice.
 - Tutors should not prompt trainees and should check all steps are followed correctly (including in the hygiene facility).
- During the practical session on the use and maintenance of RPE:
 - Tutors should demonstrate how to and trainees should practice on their assigned respirator to:
 - fit and wear their assigned full-face mask;
 - carry out a 5 seconds interval leak test;
 - check the flow rate;
 - set up correctly the respirator, motor, belt, battery and filter.
 - Tutors should check that each trainee fits their RPE in a correct manner and visually inspect that each trainee achieved a good seal between the face and their RPE.
 - Trainees should be trained on the maintenance of their assigned respirator. Tutor should demonstrate the maintenance of delegates' assigned RPE and trainees should practice on an individual basis.
 - Trainees should also be trained on how to use, wear and maintain RPE.
- The course should include demonstration and practical session on controlled stripping techniques (including the use of multipoint injection system and the practice of spraying and shadow vacuuming techniques) and tutors should allow sufficient time for these activities.
- The course should include a demonstration or practical session on the bagging of waste and the removal of waste bag through the baglocks. These procedures could be simulated in the classroom using marking on the floor to delineate a three stage baglocks.

Added recommendations for new supervisors courses

- The course should not be a diluted course for operatives with limited additional knowledge relevant to supervisors' roles. The course should deliver all the core topics listed in the chapter 4 of the Licensed Contractors' Guide for new operatives and new supervisors.
- Fault finding exercises (e.g. slides and videos showing bad practices, faulty equipment, documentations, certificates and records containing errors), case studies exercises (including development of a plan of work and site set up exercise from diagrams), problem solving activities (e.g. amendment of a poor plan of work) and group discussions should take an important part of the delivery of the training.
- The course should include advice on supervision and management including associated problems.
- New supervisor courses should include a practical session on the maintenance of a range of full-face respirators to enable supervisors to fulfil their role once on site.

Specific recommendations for the assessment of trainees

- Tutors should remove training manuals and notes during the written test exams.
- Tutors should not leave the classroom unattended during the written test exams.
- Trainees should be individually assessed during the individual practice of transit and decontamination procedures and the use, wear and maintenance of full face RPE.
- A trainee who fails an individual practical session should be allowed to retake it.
- Tutors should assess and record the performance and attainment levels of trainees during the practical sessions as well as assign a pass or fail mark for each practical session.

1 INTRODUCTION

1.1 BACKGROUND

It is essential that every asbestos removal workers receive adequate training to reduce their risk to health from asbestos. Appropriate training, by competent professional trainers, is the main opportunity to instil good practice in new workers. The regulation 9 of CAWR states that: “Every employer shall ensure that adequate information, instruction and training is given to those of his employees (*including operatives, supervisors and managers*)”. The updated EU directive (2003) amending council directive 83/477/EEC stipulates that: “Every employer shall provide appropriate training for all workers who are, are likely to be, exposed to asbestos.”

In April 2002, a course for asbestos removal worker was attended by a member of Inorganics and Fibres Section before the update of CAWR and the issue of a new ACOP (HSL draft report MF/2003/13). Amongst other issues, it was found that:

- the amount of training duration for key topics was too short;
- no practical based training on key topics was carried out;
- the assessment based on question did not provide an objective judgement on the trainee’s ability to work safely at asbestos removal sites.

The same year, a review of training provided for operatives and supervisors was also carried out by Work psychology section (Review of Training Provided to Asbestos Removal Workers WPS02/06) concluding that more emphasis was required on the delivery of practical training to ensure that employees could follow essential procedures correctly.

In 2002, the Control of Asbestos at Work regulations (CAWR) was updated and a new ACOP issued. This introduced requirements for practical training for new operatives and more focused relevant annual refresher training for existing asbestos workers.

In 2004, a new consolidated guidance replacing existing HSG and EH series for licensed contractors, training providers etc (Asbestos: The Licensed Contractors’ Guide) was drafted. This guide contains comprehensive new training guidance. In October 2004, the Asbestos Training Providers’ Working Group (ATPWG) decided to release the draft training chapter of the Licensed Contractors’ Guide (Training for employees, supervisors and others working with asbestos-containing materials) to ensure that initial training courses are redesigned to meet the agreed training modules and course criteria for asbestos training. Since January 2005, training providers and employers must comply with the guidance in the training chapter, even though the Licensed Contractors’ Guide (HSG 247) (HSE 2006) was only published in July 2006.

The training chapter of the Licensed Contractors’ Guide provides a comprehensive guide to the training requirements for personnel involved in licensed asbestos removal work. It explains what sort of training should be given and outlines course contents in the form of modules. The chapter also contains the design criteria for asbestos courses agreed in consultation with asbestos training providers including:

- Course content:
 - The course should cover a minimum of specific modules (the numbers of the modules that have been passed should be on the training certificate or card).
 - The courses should be role specific.

- Duration of courses. The minimum duration for new operatives and new supervisors course is **3 days** including **1 day of practical**. The definition of a day's training is at least **6 hours** not including break.
- Tutor to delegate ratios. The maximum ratios for initial courses are:
 - Theory based sessions for all-courses: 1 tutor for 12 delegates.
 - Practical sessions: 1 tutor for 6 delegates.
- Assessment of attainment levels:
 - The tutor should assess what delegates have learnt as the course progresses.
 - It is expected that a test will be provided at the end of the course. The delegates should achieve 80% or more in the test to obtain a pass mark.
 - Oral test should be offered to persons with learning difficulties. Special needs of delegates should be identified before the start of the course and the training programme to be modified in consequence.
 - Delegates who fail the test should be allowed to retrain or retake the test.
- Practical sessions for new operatives and new supervisors. Four core subjects have to be provided in the form of a practical module (The use of decontamination facilities; The use and fitting of RPE; The use of control stripping techniques; Construction of enclosures and airlocks). Chapter 4 of the Licensed Contractors' Guide also stipulates that waste removal procedures (by demonstration) must be provided in the form of a practical module (in accordance with L28).

1.2 AIM AND OBJECTIVES

The aim of the project was to review and assess current training provision for asbestos removal workers against HSE and European guidelines. This was accomplished by attending six initial training courses for asbestos operatives (including an in-house training provider course) and one for asbestos supervisors.

The objectives were to:

- ascertain whether current standard of training are complying with Regulation 9 of the CAWR amended in 2002, the training chapter of Asbestos: The Licensed Contractors' Guide and with the updated EU directive (2003) amending council directive 83/477/EEC on the protection of workers against risks from exposure to asbestos;
- make recommendations where training could be strengthened;
- provide feedback to the Asbestos Licensing Unit (ALU) and the Asbestos Training Providers' Working Group (ATPWG) on the current standard of training.
- provide a benchmark for HSE and trainers for good practice.

1.3 PURPOSE

Appropriate initial training, provided by competent professional trainers, is the main opportunity to instil good practice in new workers. This report will propose a benchmark of asbestos removal worker training that will:

- provide feedback to HSE and asbestos trainers;
- provide information to update training legislation CAWR (2006) and guidance (ACoP L28 and Contractors guide);
- support HSE Health Unit's to improve asbestos training standards.

2 METHODOLOGY

2.1 WORK PLAN

The project was carried out by:

- attending seven training courses for asbestos removal workers (six training courses for operatives including an in-house training provider course, one initial training courses for supervisors).
- gathering intelligence including training manuals and questionnaires;
- reviewing and assessing courses against HSE guidelines (ACOP L28 and the Chapter 4 of the Licensed Contractor's guide) as well as European guidelines (including assessing delivery and duration of topics, type and length of practicals and demonstration, involvement of trainees during courses, assessment type and conditions, exam's questionnaires).
- producing a project report.

2.2 METHODS

Selection of training providers

HSE selected the seven training providers (TPs). A member of the Inorganic and Fibres Section (HSL) attended the courses on the basis training providers received enough booking to run initial training(s) during this nine months project. All the training providers visited were registered with the list of training providers displayed on the HSE website. This meant that they had agreed to follow the guidance contained in the training chapter of the Licensed Contractors' Guide.

HSL contacted the selected training providers after HSL and HSE had explained the proposed work to ATWPG at two asbestos training providers meetings.

Assessment

The Inorganic & Fibres and the Work Psychology sections (HSL) designed checklists (see appendices 1 to 6) to assess and review the seven training courses.

2.3 DEFINITION OF TERMS

Operative: the definition from the dictionary for operative is: "A skilled worker, especially in industry."

Supervisor: the definition from the dictionary for supervisor is: "A person who has charge of a workplace or authority over a worker".

Initial training: “Initial training is required for employees new to licensed asbestos work.”

Practical training: Practical training means hands on training where trainees practice going through procedures, usually in a simulated environment. The definition in the Chapter 4 of the Licensed Contractors’ Guide is: “The delegates are shown how to do something and then are required to practise in order to acquire a new skill.”

Demonstration: Demonstration involves the tutor showing and explaining equipments (e.g. multi-point injection system, full-face respirator, H type vacuum cleaner) or procedure (e.g. maintenance of full-face respirator; decontamination procedures).

Lecture / theory: Lecture involves the tutor presenting material to the students usually using power-point presentation, which puts students in a passive role.

3 RESULTS AND DISCUSSION

3.1 NEW OPERATIVES TRAINING COURSES

3.1.1 General results on the delivering of new operatives course

Six asbestos-removal training courses for new operatives, operatives including an in-house training provider course were attended. The courses covered initial training modules and were attended by new employees to licensed asbestos work or employees needing to attend a new operative course. These three days courses took place at the training providers premises and, in general, had dedicated permanent facilities for practical sessions. Half of the training providers hired hygiene facilities for the course (a day or two).

The number of delegates per course varied from 5 to 13 with in general a ratio tutor to delegates for theory session of 1/9 or less and a ratio tutor to delegates for practical session of $\leq 1/7$. During the course, training days usually finished between 4 and 5 pm with the exception of TP3 courses, where days finished between 5 and 6 pm. On average the course duration (excluding written test assessment time and break) was 16 hours and varied from approximately 14 hours (TP5) to 22 hours (TP3). Some of this time is waiting time for trainees during the individual practice and assessment of decontamination procedures or maintenance of RPE. The in-house training provider (TP3) decided to prolong the training on a fourth day due to a lack of time and to enable each trainee to carry out the practical exercise on decontamination and transit procedures without being pressed by time. Chapter 4 of the Licensed Contractors' Guide states a minimum of three days asbestos-removal training course for new operatives and stipulates that: "a day's training means at least 6 hours not including breaks". TP3 course was the only new operatives training delivered within the requirement in terms of duration of the course (at least 18 hours).

In general, the training providers did not request from the employers or employees a training needs analysis, with exception to the in-house training provider (TP3). A TP (TP5) conducted a short TNA at the beginning of the three days. However, throughout the course, all tutors questioned delegates about their previous work experience. At the beginning of the course, the TPs also asked trainees to let them know if they had any difficulties in reading or writing which may affect their understanding of the lectures and of the questions in the written assessment.

All tutors had good knowledge, personal practical experience in the asbestos industry and demonstrated enthusiasm about the subject. The course was usually covered by two tutors (except for TP5): a tutor lecturing with extensive background knowledge on regulations and a tutor organising and supervising the practical exercises with previous experience as an asbestos removal operative or supervisor. All courses were relevant to delegate's work and role. Moreover, tutors had stories and real situations that they experienced or witnessed to tell in order to illustrate points during the course. In general, the tutors established a friendly approachable relationship with the trainees.

The objectives and the schedule of the courses were usually highlighted at the start of the course and or day. Conclusions by summarising main key points, were usually presented at the end of each modules rather than at the end of each day. In general, throughout all courses, there was a very good emphasis on the fact that asbestos removal operatives:

- should follow procedures;
- should not take short cuts otherwise they will put their own safety at risk and the safety of others;
- should all work as a team and if one person does things wrongly it will put others at risk;

- cannot afford to make mistakes, if they are not sure how to do things properly to ask and question experienced colleagues / to look back at their training manual.

A good variety of teaching methods (including lecture, practical, demonstration and projection of video) were usually utilised during these training courses. On the whole, the first day was mainly dedicated to lecturing. Practical sessions were either introduced during the second and third days of the course or left for the third day. This last option meant that the teaching methods for day 1 and 2 were less varied and very intensive on lecturing.

On average, lecture was the predominant method of teaching (6 hours 55 minutes, 42% of total course duration) followed by teaching through practical sessions (6 hours, 36%), demonstration (1 hour 30 minutes, 9%), classroom exercise (1 hour 10 minutes, 6%) and projection of video (45 minutes, 4%) (see figure 1). However, the duration and predominant method(s) of teaching varied amongst training providers (see figure 2).

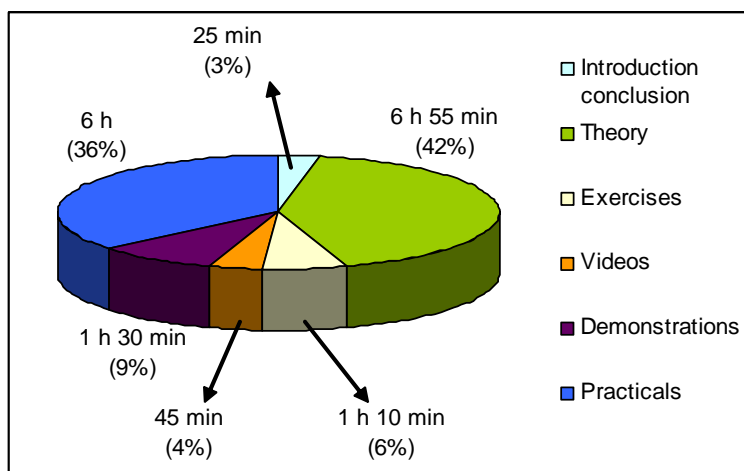


Figure 1. Average length of time spent on a variety of teaching methods - New operatives courses.

Figure 2 shows the length of time spent on a variety of teaching methods for each training provider during the delivery of new operatives courses. For three TPs, lecturing was the favoured method of teaching taking 60 to 47% of the total course duration (up to 10 hours on a 17 hours course for TP2). The duration and the percentage of time allocated to the practical sessions varied tremendously amongst training providers from more than 10 hours (47% of total course duration) for TP3 to less than 3 hours (16% of total course duration) for TP2. TP2 replaced some practical session by demonstration sessions (e.g. demonstration on maintenance of full-face respirators and on the use of negative pressure units; items sometimes not covered at all or in such details by other TPs).

Even though, with reference to the chapter 4 of the Licensed Contractors' guide, new operatives course should include one day of practical session, only half of the TPs spared 6 hours or more on practical training and some of this time is waiting time for delegates during the individual practice and assessment of decontamination procedures.

On average, tutors spent one to two hours demonstrating procedures or showing and explaining equipment, which relates in term of percentage time allocation to about 9% (this figure do not include the time tutors employed to instruct and direct delegates during the practical sessions on construction of enclosure). The projection of a video can also be an instructive way to demonstrate procedures and equipment. However, at the moment, the videos, which are commercially available, generally focus on the uses and health effects of asbestos, where asbestos can be found and regulations. The time allocated to the projection of videos varied from 25 minutes to 1 hour 30 minutes (2 % to 10% of the course duration).

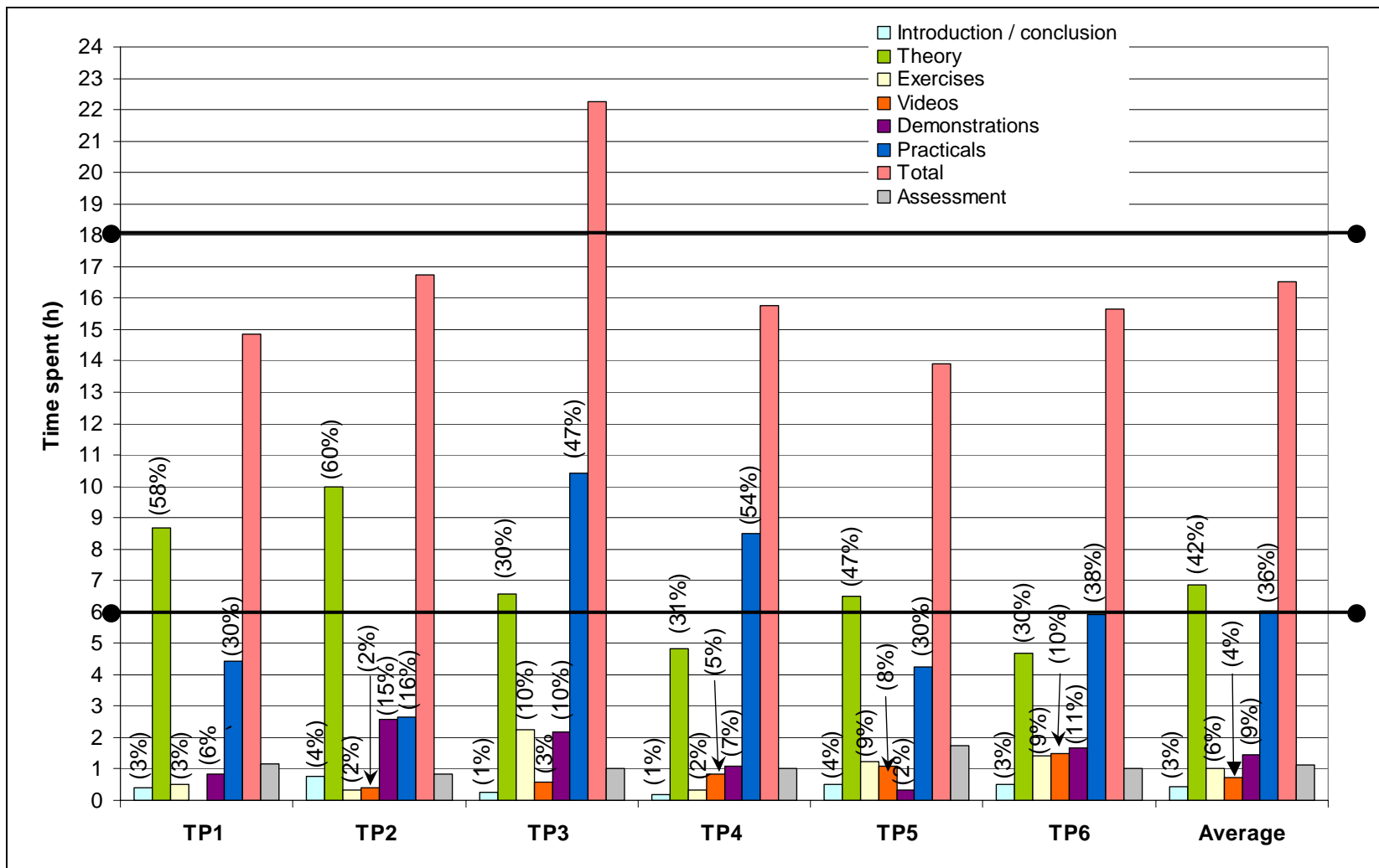


Figure 2. Length of time spent on a variety of teaching methods for each training provider - New operatives courses

The time spent by delegates on classroom exercise was usually limited (from 20 minutes (TP2 and 4) to 2 hours 15 minutes (TP3) with an average of 1 hour 10 minutes).

All tutors had consulted the chapter 4 of the Licensed Contractors' Guide and were aware of its contents and requirements, with exception to tutors TP4. However, some requirements from the guide had been implemented in the course of TP4 such as the inclusion in new operatives courses of a day of practical sessions.

In general, these three day new operative training courses were very intensive since a lot of information had to be delivered in a short period of time.

3.1.2 Classroom lecturing

On average, lecture was the predominant method of teaching (6 hours 55 minutes, 42% of total course duration) and the time allocated to this method of teaching varied from less than 5 hours to 10 hours. TPs provided a lot of information through lecturing with the first day mainly dedicated to this method of teaching. These three days new operative courses included very long intensive period of lecturing.

All tutors used power-point slides to deliver the lectures. Few utilized a whiteboard or flip chart to highlight important specific points or described scenarios of work (e.g. site set-up, where to place the enclosure, airlocks, negative pressure unit, bag-locks, waste skip). Lectures were very formal and well structured.

Training providers organised lectures in a sequential chronological manner (e.g. what is asbestos, types of ACMs, risks and health effects, legislation, site set-up, construction of enclosure, RPE and PPE, controlled stripping techniques, personal decontamination etc...). However TP2 explained briefly (1 hour) at the beginning of the course the risks associated with asbestos-containing materials and the unrolling of a typical asbestos removal work (the construction of an enclosure, the decontamination procedures and the air monitoring measurement). The main purpose was to provide an overview of the job and a framework for trainees' learning.

In general, during the lectures, TPs asked the trainees if they had any questions. It can be difficult for trainees to respond to this vague question. Some TPs also asked specific questions, a more effective way to check trainees' understanding and learning of the information and to encourage discussion. However, the courses usually included limited opportunities for group discussion due to the large amount of information to deliver during these three days. Opportunities for discussion and active learning can also be provided during classroom exercises. In general, TPs committed limited period of time to these activities (about 1 hour or less) (see paragraph 3.1.4 for more detailed information), with the exception of TP3. TP3 divided the classroom into two groups and introduced quizzes covering the main key points throughout the lecture (the winning team was awarded with high street vouchers).

All TPs supplied a training manual, which was distributed either at the beginning of the course or at the end to encourage note taking. In general, TPs provided motivational cues (e.g. this information is important and you may be asked a question on the written exam). They also repeated and emphasised key points and related contents to previous and subsequent topics / modules.

Course content

Figure 3 shows the time spent on lecturing the main modules by each training provider. As mentioned previously, all tutors had consulted the chapter 4 of the Licensed Contractors' Guide and were aware of its contents and requirements, with exception to tutors TP4.

In general, the category "other" in figures 3 and 4 refers to fault finding, roles and responsibilities, site inspection, risk assessment and plan of work.

During lecturing, all TPs dedicated a significant proportion to the following background modules: types, uses and risks of ACMs (average of 55 minutes of the total lecturing time); health hazards, health surveillance (30 minutes); legislation (35 minutes). A variety of videos usually reinforced the lecturing of these modules.

The lecturing time devoted to the module "site set up and dismantling" varied tremendously from 20 minutes (TP4) to 2 hours (TP2) with an average of 1 hour 10 minutes. Tutors had to convey a lot of information (e.g. pre-clean, site layout, explanation of NPU, construction of enclosure, daily inspection). All tutors also included practical session on the construction of enclosure and airlocks to complement the lecturing of this module.

Tutors spent on average of 35 minutes lecturing on the module "Transit procedures & decontamination modules" (including entering exiting work area, decontamination procedures, layout of hygiene unit and equipment). An important part of this module was also delivered using practical sessions, exercises and in some cases demonstration teaching methods.

An important proportion of the information of the module on "controlled stripping techniques" was delivered through lecturing. Few tutors also showed videos on this topic and a small proportion of information was conveyed using practical sessions and demonstration teaching methods. The lecturing time spent on this module greatly varied from 5 minutes (TP4) to 95 minutes (TP1) with an average of 55 minutes. Except for TP4, tutors explained all main controlled stripping techniques for licensed asbestos containing materials. Training providers usually did not cover the removal of non-licensed materials as well as vacuum transfer and air management controlled removal methods since they usually consider these two techniques as inefficient or problematic.

Tutors spent an average of 25 minutes lecturing on RPE and an average of 10 minutes on PPE. The lecture on RPE was mainly focused on the type of full face and half face masks available, the circumstances where RPE must be worn, the need for fit-test, a good seal and the need to be clean shaven. The use and selection of gloves was rarely mentioned.

Tutors spent an average of 25 minutes lecturing on the module "cleaning and clearance air testing". In general, all tutors explained the four-stage clearance procedures but gave little or no guidance on how to clean the contaminated areas (enclosure, airlocks, hygiene units and equipment).

Tutors delivered the module on "waste management and disposal" through lecturing but, in general, dedicated very little time on this important topic (from 1 minute (TP4) to 35 minutes (TP2) with an average of 15 minutes). Tutors usually did not describe how to close waste bags and explained briefly the procedures on the bagging of waste and removal of waste bags through the bag-locks.

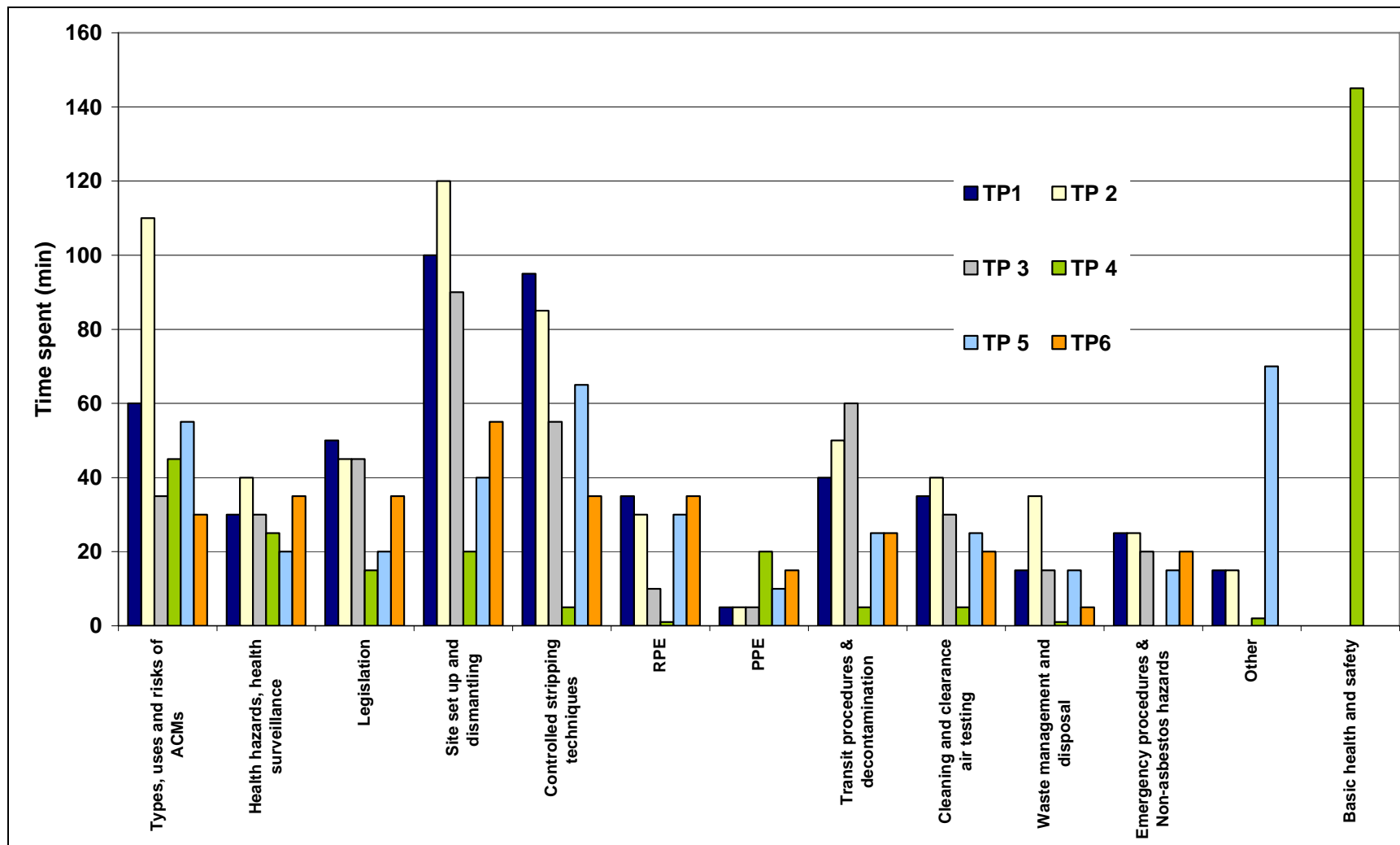


Figure 3. Length of time lecturing the main modules listed in the Chapter 4 of the Licensed Contractors' Guide

TP4 included a basic health and safety lecture (2 hours 25 minutes) without linking it with the asbestos removal works and therefore had limited time to lecture on the core topics listed under the Chapter 4 of the Licensed Contractors Guide.

Tutors usually dedicated a limited specific amount of time to the topic “risk assessment and plan of work” but they usually referred to the risk assessment in the lecturing of other specific modules (e.g. controlled stripping techniques or other hazards). TP5 dedicated 40 minutes on risk assessment and plan of work for asbestos removal jobs.

Tutors covered the modules on “record keeping” and “management systems and monitoring” during the lecturing of related modules such as site- set up or controlled stripping techniques. In general, tutors clearly highlighted the importance of air monitoring. All tutors also clearly explained and emphasised the operative roles and responsibilities in the asbestos removal industry throughout the courses.

The figure 4 shows the average lecturing time for the main modules (from types, uses and risks of ACMs to Waste management and disposal) of the six new operative courses attended during this project.

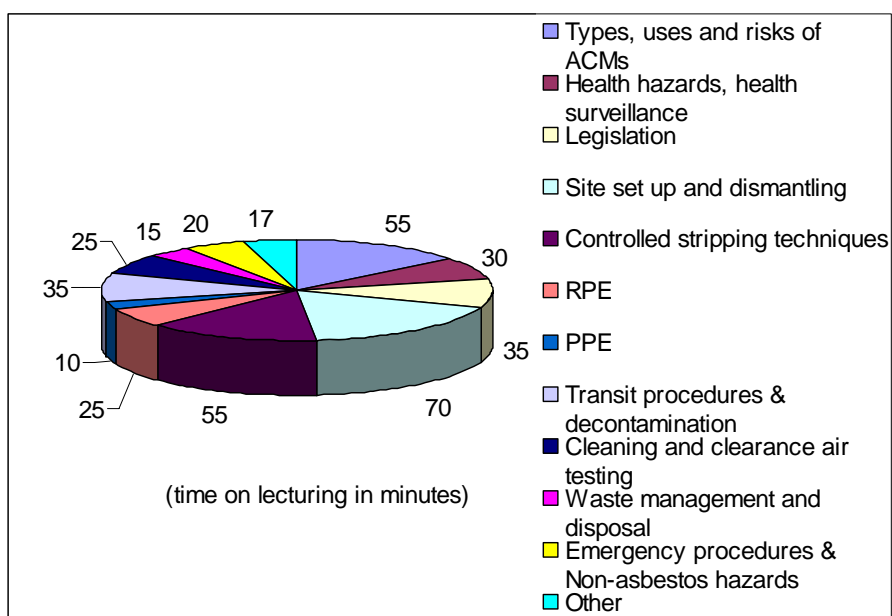


Figure 4. Duration of the lectures for the main modules of new operatives training course.

Scientific concepts such as a concentration, a control limit or a size (μm) can be difficult to understand by a non-scientific audience. Tutors did not always explain these concepts and trainees might have had difficulties in grasping and understanding certain knowledge. For example, a μm size fibre can be referred as a fibre of the size of a hair fly leg or as a fibre 100 times smaller than a human hair.

The meaning of 0.1 f/ml or 0.001 f/ml can be difficult to comprehend and these figures may be better understood as a concentration in fibre/l. Tutors could bring a 1 litre bottle and explained that a concentration of:

- 0.1 f/ml would correspond to 100 fibres in the 1 litre bottle;

- 0.001 f/ml would correspond to 1 fibre in the 1 litre bottle.

The calculation of air changes per hour is another difficult concept. TP1 has efficiently illustrated / demonstrated the 8 changes per hour concept during the practical session by smoke testing the enclosure and by timing the 8 minutes for the work area to clear from the smoke.

3.1.3 Videos projection

Audiovisual aids can strengthen lecturing, assist trainees' learning and can be an instructive way to demonstrate procedures and equipment. The video shown during the six new operative courses were as follows:

How are you today? (HSE video). "The video is a hard-hitting portrayal of the final days in the life of a building worker suffering from mesothelioma. The key message is the importance of checking whether material contains asbestos before starting work."

Three TPs projected this video during the new operative course.

Rochdale programme investigation. This video includes: What is asbestos; Uses of asbestos; Promotional images of working conditions in South African asbestos manufactures; History of Turner & Newhall asbestos factory in Rochdale; History of workers who died from asbestos related diseases.

One TP projected this video during the new operative course.

CITB news asbestos alert. "Made in the style of an investigative news programme and using a well-known presenter, Asbestos Alert is aimed at all managers, supervisors and employees who may come across asbestos while they are at work. It describes the hazards and ill health effects arising from exposure to asbestos and what supervisors and employees should do if they find anything that may be, or may contain, asbestos. It also covers the identification of asbestos on site, particularly on small works, maintenance, repair, renovation and demolition sites and the actions that should be taken when it is found."

Three TPs projected this video during the new operative course.

A guide to the control of asbestos (2003 Manestream Ltd). This DVD includes: You, your business and asbestos; Control of asbestos at work regulations; What is asbestos; How you can identify asbestos materials in buildings, asbestos surveying and sampling procedures; Analysis of asbestos; Duty to manage asbestos in non-domestic dwellings; Assessment of work and management planning; What are the requirements for obtaining a license from the HSE training, equipment, management system; Working with asbestos insulation, asbestos coating and asbestos insulation board; The role of analyst; Supervisory, occupational testing for asbestos fibres; Working with asbestos that doesn't normally require a licence; Working with cement and minor works; Asbestos waste.

Three TPs projected this video during the new operative course.

60s - 70s black and white HSE video - Installation and dry removal of lagging / limpet. This black and white video, shot in the 60s - 70s, shows high level of dust generated during the installation and dry removal of asbestos lagging around pipes / limpet. This video highlights bad practices and was used by training providers to engage a discussion on risks, exposure levels and bad work practices. It allows training providers to emphasis on:

- the importance of taking preventive measures;

- likely levels of asbestos fibres during uncontrolled dry removal versus levels during controlled wet removal;
- respiratory protection factors and the fact that respiratory protective equipment (RPE) is the last line of defence against asbestos exposure.

(This video is not commercially available). One TP projected this video during the new operative course.

Mark & Spencer video - Removal of asbestos insulating board (AIB) ceiling tiles. This video, shot approximately 5 years ago, was a training video for the removal of single AIB ceiling tile in Mark and Spencer shops. It covers:

- The removal of single AIB tiles using a mini-enclosure.
- The removal of several AIB tiles using a mini-enclosure connected to a H type vacuum cleaner.

It includes: the setting up of a mini-enclosure; the removal of single tile using shadow vacuuming and spraying techniques; the bagging of tiles and their replacement by non-asbestos substitutes; the clean up and dismantlement of the mini-enclosure; the workers RPE / PPE (e.g. P3 half-mask respirator) and succinct decontamination after work.

A training provider used this video to illustrate the controlled stripping of ceiling tiles and to engage a discussion with delegates on faults or bad practices.

(This video is not commercially available). One TP projected this video during the new operative course.

Asbestostrip Innovations UK Ltd promotional video. This video includes a description of the multipoint needles injection system (its components and different accessories) and explains its running. It also shows the injection on-site of an asbestos insulation pipe.

Two TPs projected this video during the new operative course.

Trainees may have difficulties to understand and imagine the correct procedures through lecturing using power-point presentation. On one occasion, during the practice / assessment of decontamination procedures, a trainee removed his RPE too quickly in the shower. This trainee had passed the written exam and had correctly listed the decontamination procedures on paper.

At the moment, the videos, which are commercially available, generally focused on the uses and health effects of asbestos, where asbestos can be found and the regulations. Very few videos if any cover the technical aspects of site work such as the use and maintenance of RPE, the use of controlled stripping techniques, decontamination procedures, the bagging and removal of waste from enclosures.

Courses and trainees' learning would highly benefit from a video on: decontamination procedures; waste bagging and removal procedures; on-site controlled stripping techniques (e.g. wrap and cut and multipoint injection equipment for pipe lagging, removal of AIB ceiling tiles); use and maintenance of equipment (e.g. multipoint injection system, negative pressure unit, H type vacuum cleaner); bad practices. Videos showing bad practices can be a good medium to encourage trainees to think actively and engage discussion.

3.1.4 Classroom paper exercises

Questions exercises or problem-solving activities can strengthen lecturing, encourage trainees to use the information they should gain from the lecture and promote group discussions.

However, in general, TPs included a very limited number of questions or problem-solving classroom exercises to their new operative courses. The duration of this activity varied from 20 minutes (TP2) to 2 hours 15 minutes (TP3) with an average of 1 hour 10 minutes (6% of the total course duration).

These exercises included:

Round table exercise on transit procedures and decontamination.

- Three TPs (TP2, TP3 and TP4) asked the trainees to cite orally each steps of the transit procedures for entering and exiting work area including decontamination and the tutors corrected any mistakes. The average length of time for this exercise was 15 minutes.
- TP5 asked the trainees to list the items present in an hygiene unit.

Questions quiz exercise (in-house training provider TP3; duration: 2 hours 10 minutes). The tutor divided the classroom in to two groups (team A and team B) and introduced quizzes covering the main key points throughout the lecture during day 1 and 2 of the training course. The winning team was awarded with high street vouchers. Trainees were asked in team to:

- answer questions covering all main modules of the course;
- list the most important items found in an enclosure (Team A) or draw a list of what to check for RPE;
- list the items found in the hygiene facility;
- list the transit and decontamination procedures.

The competition between the two teams encouraged active learning.

Fault finding exercise in a method statement (TP5; duration: 1 hour 10 minutes) The trainees (per group of 2 or 3) were given a poor sample method statement and had to list the mistakes and bad practices.

Risk assessment exercise (TP6; Duration: 30 minutes). The trainees (per group of 2 or 3) were given different scenarios of work and had to complete a risk assessment. They had to think about the hazards, the controls to eliminate or reduce the risk. They also had rate the risks before and after the implementation of the controls. The scenarios of work were: the removal of a pipe lagging in a boiler room; the removal of a sprayed coating from a lift; the removal of asbestos insulating board ceiling tiles from a tower scaffold.

Paper exercise on emergency procedures. (TP6; Duration: 30 minutes). The trainees (per group of 2 or 3) were given scenarios of emergency situations and had to list the steps and procedures to be followed in such situations. The scenarios were: an accident or injury to a person; a fire; a rupture of enclosure.

3.1.5 Practical and demonstration sessions

Practicals were the second most favoured method of teaching after lecturing with an average of 6 hours (36% of total course duration) and the time allocated to this method of teaching varied from 2 hour 40 minutes to 10 hours 25 minutes. TPs also inserted demonstration in the courses (average length of time spent on this activity was 1 hour 30 minutes representing 9% of the total course duration).

On average, tutors dedicated 3 hours 15 minutes (53%) to the practical sessions on the construction of enclosure and airlocks compared to 2 hours 15 minutes (38%) on transit procedures and decontamination, 25 minutes (6%) on maintenance of RPE and 10 minutes (3%) on controlled stripping techniques (see figure 5).

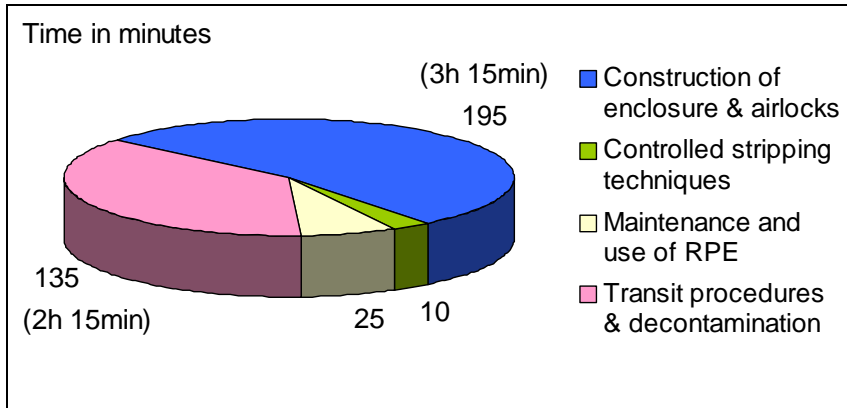


Figure 5. Average duration and distribution of practical sessions

The time assigned to the practical sessions on transit procedures and decontamination varied amongst training providers. All courses included individual practical sessions on transit procedures and decontamination lasting from 7 to 35 minutes per trainee with a number of trainees per session varying from 5 to 9. In general, each trainee waited while his colleagues practised the procedures. An important part of the 2 hours 15 minutes accounted for waiting time.

Few tutors included individual practical sessions on the maintenance of RPE and on controlled stripping techniques, resulting in a low average time assigned to these activities.

The time dedicated to the practical and demonstration sessions on the maintenance of RPE and on controlled stripping techniques increased to 1 hour 10 minutes and 35 minutes respectively (see figure 6).

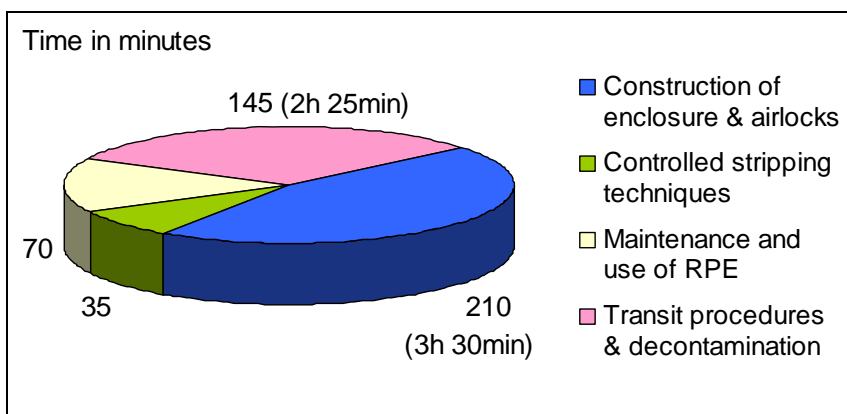


Figure 6. Average duration and distribution of practical and demonstration sessions

Two TPs divided the trainees' group in two and run two parallel sessions at the same time (e.g. a lecture and a practical session or two practical sessions on two different topics). For example, in the morning, tutor 1 from TP6 supervised and instructed group 1 during the practical session on the construction of enclosures and airlocks while tutor 2 individually assessed trainees during the practice of the maintenance of RPE and of decontamination procedures. During the afternoon, the tutors swapped groups. It is a clever way to gain time, since a trainee will have to wait during the

assessment of his colleagues. Also TP3 individually assessed each trainee on the maintenance of RPE while the rest of the group completed the tenting of the enclosure and airlocks.

Practical and demonstration session on decontamination and transit procedures

In general, all courses included individual practical sessions on transit procedures to enter and exit work area using powered, live hygiene facilities and three stage airlocks. In general, the delegates had the opportunity to practise the procedures including personal decontamination. Most tutors assessed the delegates' attainment level using a tick box spreadsheet to ensure that all steps were followed correctly. However, the quality of the practical session and duration per delegate varied amongst training providers.

During this practical session, the trainees should be asked to:

- wear correctly appropriate personal protective equipment;
- check and fit a full-face respirator,
- undertake full transit procedures through the hygiene unit to the work area;
- undertake full transit procedures from the work area to the dirty end of the hygiene unit including carrying out pre-decontamination in airlocks when leaving the work area.
- follow procedures from dirty end to clean end of the hygiene unit including carrying out full decontamination.

Two of the six training providers did not cover in this session the practice of full procedures to enter and exit the work area:

- Although live hygiene facilities were present in all six training sites, one of them (TP4) was set up in the classroom. Consequently, this hygiene unit was not connected to water and the trainees did not carry out the full procedures by showering.
- During the course provided by TP5, trainees did not practice the transit procedure to enter work area (change of overalls) and pre-decontamination followed by changes of overalls when exiting the work area.

One training provider (TP1) did not check that trainees were following the correct decontamination procedures in the shower compartment of the hygiene unit during the practice of the procedures. A trainee attending the TP3 course removed his RPE too quickly in the shower of the hygiene facility. It is essential that, during this practical session, the trainees have the opportunity to carry out the full procedures (transit and decontamination procedures) and that the tutors check trainees' action in both the airlocks and the hygiene unit.

The duration of practice per trainee varied from 7 minutes to 35 minutes (figure 7). Very often, trainees simulated very quickly pre-decontamination procedures in airlocks when leaving the work area (e.g. very few trainers asked them to meticulously vacuum overall, boots and RPE during practical sessions or pre-wash RPE, boots in buckets with a sponge). Moreover, vacuum cleaners were not always powered or buckets filled with water. Trainees were not always taught in the classroom or showed, by demonstration, pre-decontamination vacuum procedures. Some tutors explained or demonstrated the buddy system. Nailbrushes were not always mentioned during the lectures of decontamination procedures and were usually not present in the shower of the hygiene unit during this practical session.

At least two training providers did not provide impervious easily cleanable shoes to transit from the hygiene unit to the airlocks. These trainees transited with their personal day to day shoes, which

could be confusing to inexperienced workers and installed bad practice even though they were warned that they should not do that.

In general, trainees stayed under the shower for a very short period of time (1 - 2 minutes). Only one training provider requested that delegates showered for 10 minutes to install good practice. Burdett G and Stacey P (2004) have shown that: “A three minute shower of 23l of water will remove around three quarters of the asbestos on the body. The shower procedure proved to be successful and although an absolute efficiency cannot be derived, it appears that in terms of the relative efficiency over 90% of $>5\mu\text{m}$ long and PCME fibres were removed during from the body after two showers.”

TP5 spread the trainees with talc as a way of checking that trainees had properly showered and cleaned their respirator. Talc can be washed very quickly and this practice can mislead trainees on the time necessary for an efficient decontamination.

The individual practice and assessment of full procedures to enter and exit work area is time consuming (see figure 8) but is an essential part of the training. The estimated duration for an inexperienced delegate under the supervision of the tutor to carry out meticulously the full procedures is approximately 30 minutes. Some training providers split the group in two to gain time and this practice is highly recommended.

TP1 included a classroom practical exercise on the transit and decontamination procedures. Trainees individually simulated in front of their colleagues and tutor the procedures using markings on the classroom floor, which delineated the three compartments of a hygiene unit and a three stage airlocks. The tutor corrected any mistakes. The duration of practice per trainee was 8 minutes.

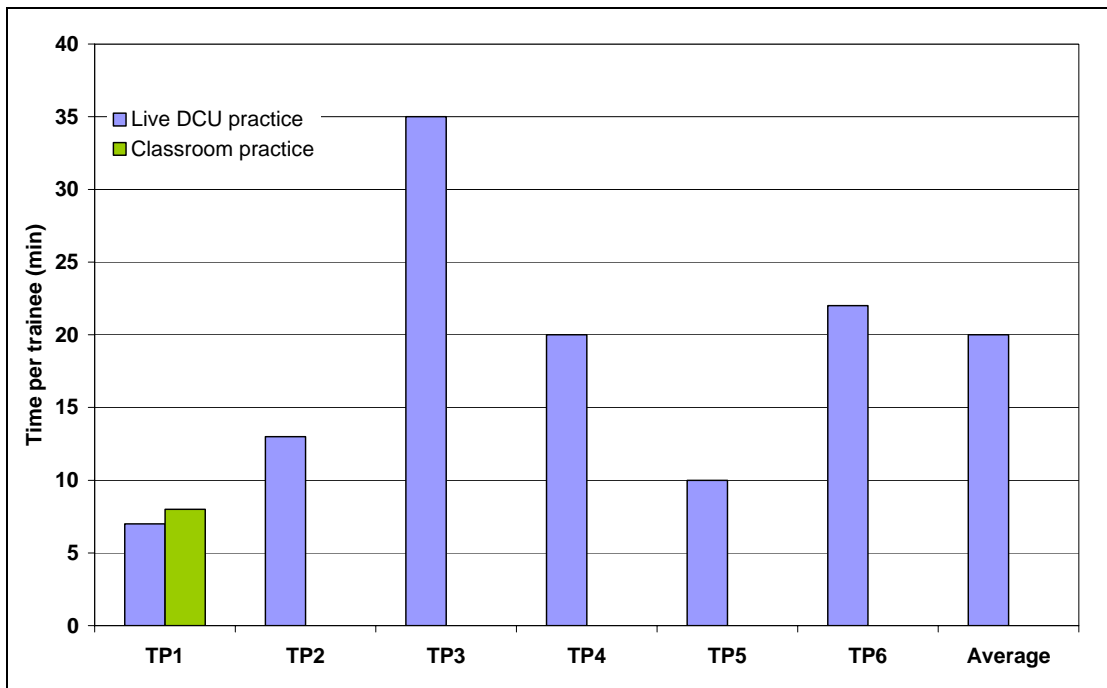


Figure 7: Time spent per delegate in practicing the transit procedures to enter and exit work area

Only two tutors demonstrated part of the transit procedures to enter and exit work area (decontamination procedures by showering not carried out). In general tutors explained verbally the steps of the procedures in the classroom on power-point presentation.

Three training providers dedicated time to show / demonstrate, explain and describe the live hygiene unit facilities to the trainees before lecturing on this topic (see figure 8). During new operative courses, trainees were usually not asked to set-up the hygiene facility (e.g. connect water and power, or level the decontamination unit).

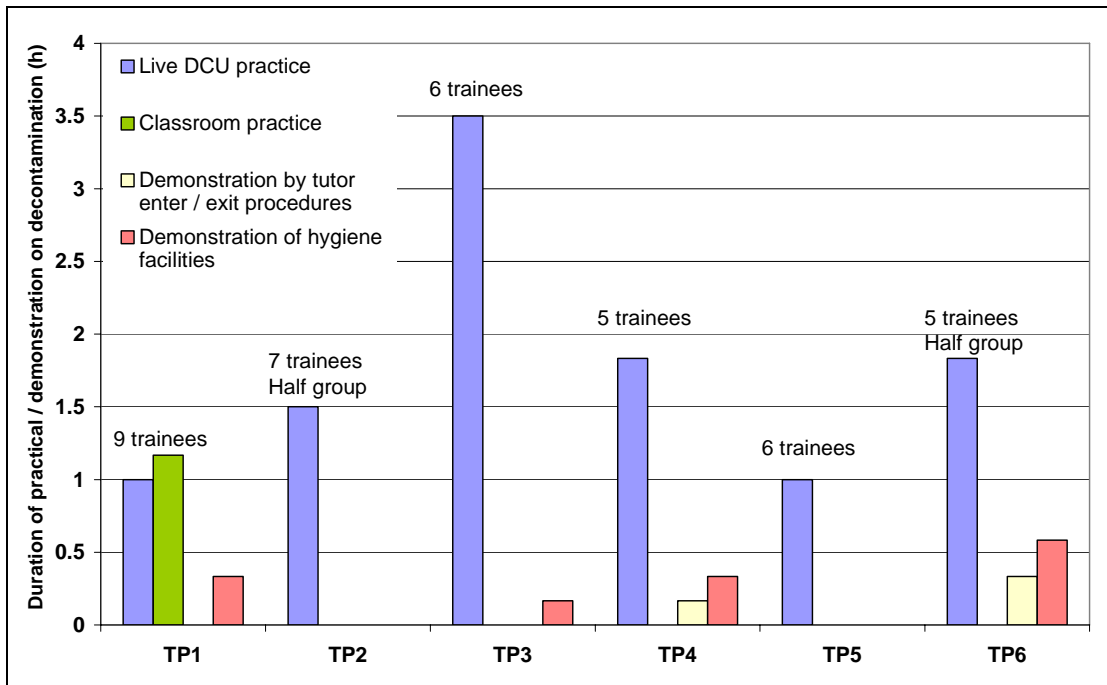


Figure 8: Duration of practical and demonstration sessions on transit procedures and decontamination.

Practical session on the use and maintenance of RPE

Few trainees were fit tested and assigned with a full-face negative pressure respirator before attending the courses. Operatives should be trained on the use and maintenance of their own respirator or on the type of respirator they will be issued with. On site, RPE should be thoroughly examined and tested, by trained personnel, at least once a month to make sure that it is working properly to its design specification. It is generally the supervisor's responsibility to carry out such checks, but one should not totally rely on the only monthly check (see new supervisor training).

During this practical session, the trainees should practice the following:

- check condition of full face respirator (including, face-piece, visor, straps, exhalation / inhalation valves, motor, battery and connection, type of filter);
- check flow rate using the rotameter;
- set up correctly respirator, motor, belt, battery, filter;
- fit respirator in the correct manner and carry out a 5 second interval leak test.

Figure 9 shows the duration of practical and demonstration sessions on the use and maintenance of RPE.

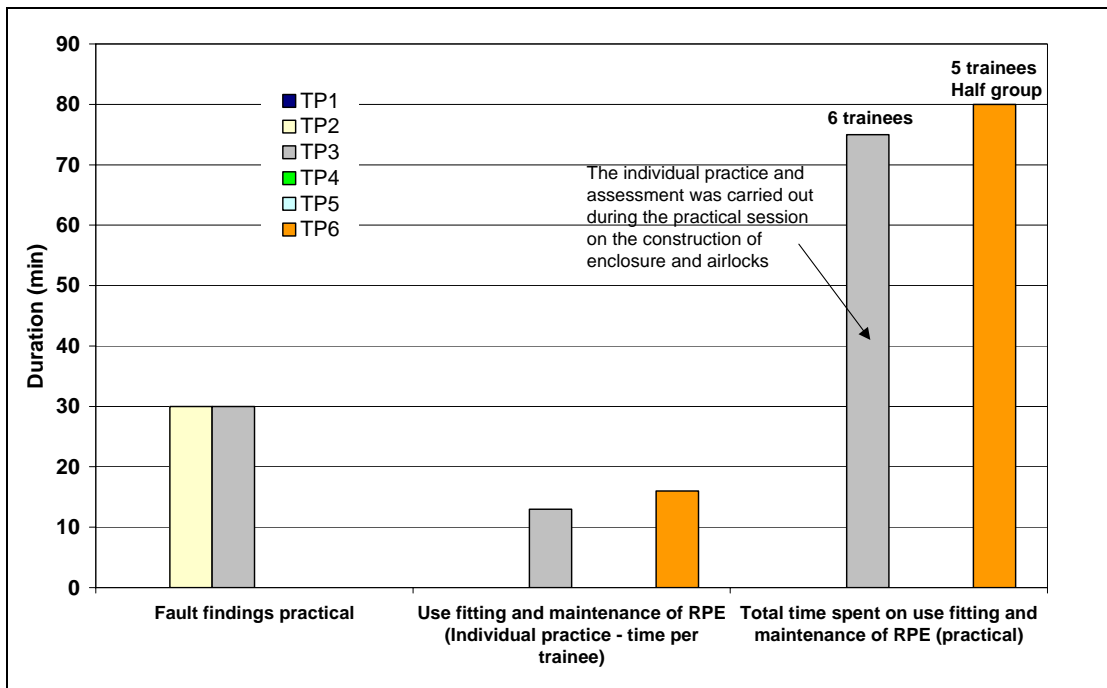


Figure 9. Duration of practical sessions on the use and maintenance of RPE

Two training providers included a faultfinding exercise in their courses. This practical exercise consisted of the observation by delegates of several full-face masks or half masks having typical defects (dirty RPE, holes, perished straps; cracked motor, missing or perished exhalation valves etc...) and the listing of these faults. This exercise was carried out on an individual basis for TP2 as part of the overall assessment or in groups for TP3 in order to assess delegates' knowledge prior to the teaching of use and maintenance of RPE. The trainees attending the TP3 course, who had already undergone training on the use and maintenance of RPE, missed most important defects.

In general, all tutors demonstrated how to fit and wear a full-face mask correctly, how to carry out a 5 second interval leak test and how to check flow rate using the rotameter. In general, the trainees practised the above during the sessions on use and maintenance of RPE or on decontamination and transit procedures. However tutors did not always:

- ask trainees to set-up correctly respirator, motor, belt, battery and filter;
- check that each trainees fit their RPE in a correct manner (e.g. trainees correctly tided straps of their RPE);
- visually check that trainees achieved a good seal between the face and the RPE;
- during the practical session on transit procedures and decontamination, ask trainees to check the flow rate of their RPE, filter and battery.

Four training providers carried out demonstrations on the maintenance of full-face and half masks using either a specific model (phantom in the case of TP3 as all delegates had been fit tested and issued with this type of respirator) or a range of RPE. One training provider, which did not include the demonstration of the maintenance of RPE in its course content, did after discussion. The

duration of this demonstration session varied from 15 minutes to 1 hour with a duration average of 38 minutes (see figure 10).

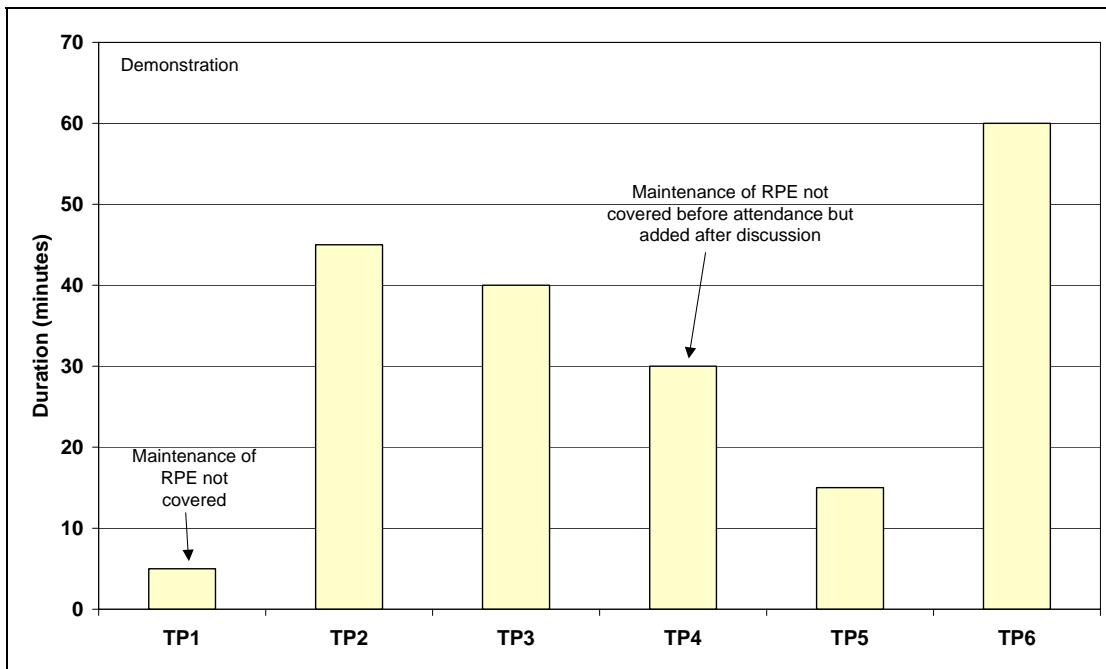


Figure 10. Duration of demonstration sessions on the on use and maintenance of RPE

Trainees attending TP3 and TP6 courses practised on an individual basis the maintenance of a full-face mask. The delegates explained the inspection process to the tutor whilst doing it and the tutors assessed the delegates' attainment level using a tick box spreadsheet. The duration of this practical session per delegate lasted approximately 15 minutes (see figure 8). (TP6 trainees waited during the assessment of their colleagues but TP6 tutor divided the trainees' group in two and run two parallel practical sessions at the same time to gain time. TP3 individually assessed each trainee on the maintenance of RPE while the rest of the group completed the tenting of the enclosure and airlocks.)

Trainees, knowing they will be assessed on the practical session, are probably more likely to pay attention and asked questions. Under the request of a delegate, the tutor from TP3 re-carried out the demonstration on the maintenance of a full-face mask before the assessment.

TP3 also demonstrated and explained how to correctly wear RPE and PPE (e.g. full-face respirator, coveralls, boots) and how to remove coveralls at the end of a shift.

Practical session on construction of enclosure and airlocks

In general, tutors instructed and supervised the trainees very closely during the practical session on construction of enclosure and airlocks. The in-house training provider (TP3) usually preferred to give less instruction to allow trainees to learn from mistakes.

During this practical session, the trainees should:

- construct an enclosure, airlock bag-lock using timber framework, metal or plastic framework, polythene sheeting, adhesive tape, staples;
- locate viewing panels;
- locate warning signs;
- attach a negative pressure unit;
- smoke test the enclosure.

All TPs inserted group practical sessions on the construction of enclosure and airlocks. The duration of this practical session varied from about 1 hour for TP2 to nearly 7 hours for TP4 (see figure 11) with an average of 3 hours 15 minutes. In these practical sessions, trainees worked together and tutors ensured that all trainees participated actively to the task. It has been show that: “teaching method involving groups working together to solve a problem or complete a task, promotes active participation, individual accountability, student ability to work cooperatively and improves social skills”.

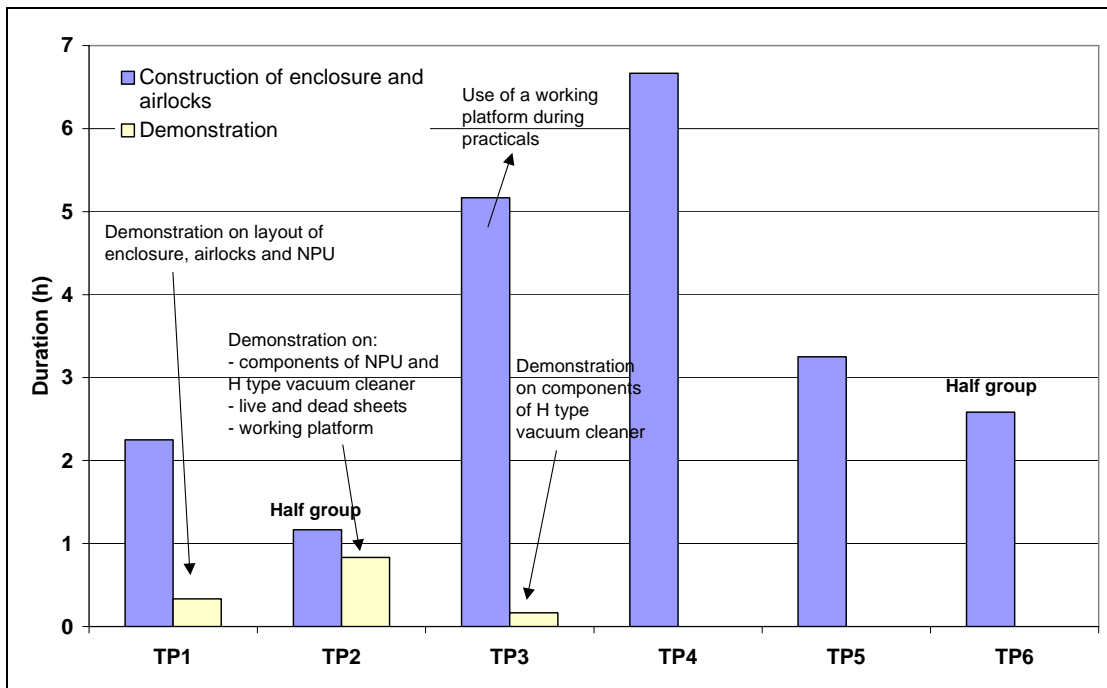


Figure 11. Duration of practical and demonstration sessions on use of controlled stripping techniques

Most TPs included on this practical session the construction of a full enclosure (using timber framework) and airlocks (using timber, metal or plastic framework). Trainees on the courses delivered by TP2 and TP6, built part of an enclosure instead of a full enclosure. Only TP3’s trainees constructed a bag-lock in addition to a three stage airlocks.

In general all trainees, as part of a group, learnt to:

- sheet correctly polythene to enclosures / airlocks frameworks using staples and duct tape;
- make / cut doors and make / install weighted flaps in airlocks;
- attach and seal a negative pressure unit;
- locate and sometimes insert viewing panels to an enclosure;

- locate external warning labels.

The constructed enclosures varied in sizes and shapes (from freestanding on timber frameworks to the classroom used as part of the enclosure).

Few TPs inserted demonstrations in the courses. All tutors demonstrated and explained the concept of negative pressure by running the NPU on the enclosure and all except TP2 smoked tested the enclosure built by trainees during the course. TP2 demonstrated the concept of dead sheet and live sheet (non-moving and moving sheet), a concept very often forgotten in these courses, and showed how to convert a live sheet into a dead sheet.

Two and one TPs included a demonstration on H type vacuum cleaners and NPU respectively by showing and explaining the different components and accessories. Trainees from TP3 dismantled a H type vacuum cleaner.

Some training providers had built a permanent enclosure on their premises or had temporally kept the enclosure built by trainees in the previous training, to demonstrate and explain the layout of the work area before lecturing.

Practical session on use of controlled stripping techniques

Chapter 4 of the Licensed Contractors' Guide stipulates that the core subject "use of controlled stripping techniques" must be provided in the form of a practical module (in accordance to L28). During this practical session, the trainees should be asked to:

- Connect, use a multiple needles injection and wet a non-asbestos pipe insulation.
- Shadow vacuum - practice the removal of a non-asbestos tile or duct panel.

In general, the practical session on the use of controlled stripping techniques was mainly delivered by demonstration. Moreover, the quality and duration of this session varied amongst training providers and one training provider (TP1) did not provide demonstration or practical session on this topic.

Although an injection system was present at all six training sites, the duration of demonstration on the multipoint needles injection system varied from 5 minutes to 70 minutes (see figure 12). This demonstration was omitted by one of the training provider due to a lack of time. In general, the tutors show and explained the purpose of the multiple needles injection system as well as how to position the needles on a pipe. Training providers who spent an hour would also describe the different components of the equipment (different needles, valves, manifold, pump...) and explain how to connect it and switch it on and off. Only one training provider (TP2) connected the equipment to water to demonstrate the different types and function of needles, the control of pressure through the needles using the valves, water running off a non-asbestos pipe when the pressure is too high.

Two training providers (TP3 and TP4) carried out demonstrations on how to remove a substitute non-asbestos material board screwed to timber framework of the enclosure using spray wetting and shadow vacuuming. Each delegate, attending the course from TP3, also had the opportunity to practice this technique (duration of 10 minutes per delegate).

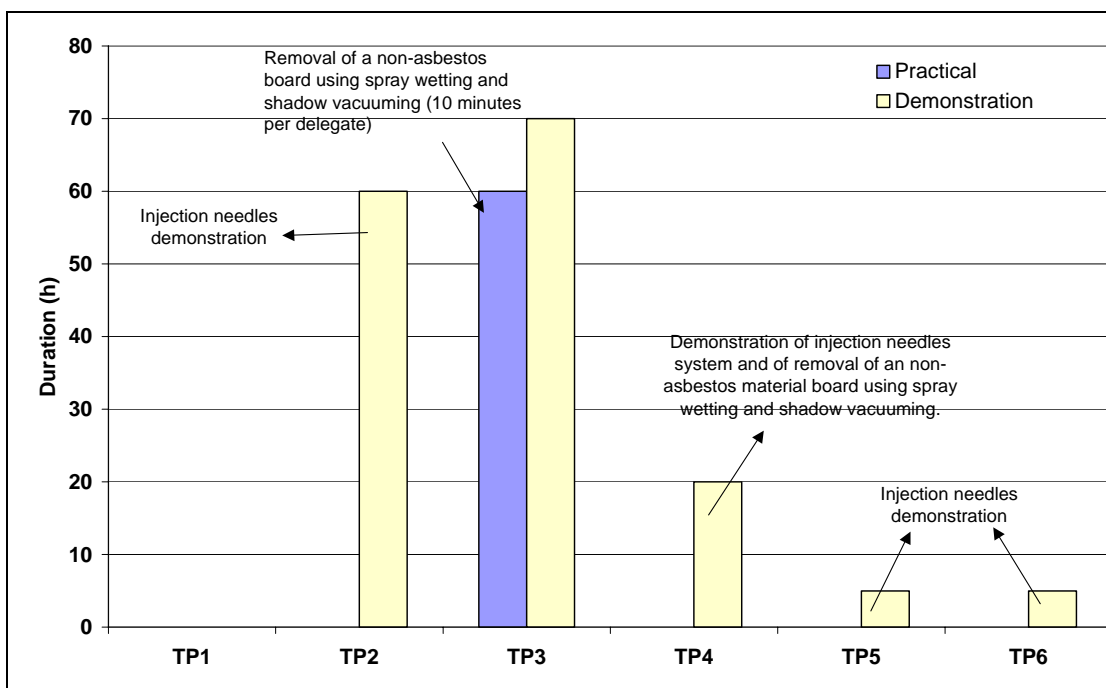


Figure 12. Duration of practical and demonstration sessions on the construction of enclosures and airlocks

This important topic, use of controlled stripping techniques, was mainly delivered in a classroom environment using power-point presentations. Very few videos on controlled removal techniques are available, which would help the delegates to better grasp and understand these techniques and the difficulties associated with them. Videos of on-site removal work for the main controlled stripping techniques (e.g. multipoint injection system and wrap and cut for pipe lagging, removal of ceiling tiles using shadow vacuuming and spraying techniques, removal of cement roof,) would be very beneficial to the training. One can acknowledged that it is difficult to set-up practical exercise on the main controlled stripping techniques during training courses.

TP4, covering very briefly the use of multipoint injection needles system in the three days new operative course, offers independent full day training.

3.1.6 Overall core topics

Completeness of material taught

All tutors had consulted the chapter 4 of the Licensed Contractors' Guide and were aware of its contents and requirements, with exception to tutors TP4. TP4's course did not include important concept such as ACMs friability and anticipated and desired fibre levels with RPE maximum exposure levels or superficially covered elements in topics on site set-up and dismantling, on controlled stripping cleaning and air testing. The tutors also focused on basic health and safety when lecturing on risk assessment, emergency procedures and other hazards without linking these topics with asbestos removal works.

In general, all other five training providers participating to this assessment project, covered in detail the core topics mentioned in chapter 4 of the Licensed Contractors' Guide using lecturing, demonstration, practical sessions or classroom exercise with the exception of the following points:

- Access to personal assessment information.
- Maintenance of RPE. TPs did not always include demonstration and practical sessions on this very important topic (see paragraph 3.1.5).
- Correct storage of RPE. Some tutors recommended hard boxes to store RPE instead of soft bags since workers can damaged their RPE if they walk on it.
- Pre-filter for RPE (not always mentioned because not often used on site since the implementation of controlled removal techniques for the removal of ACMs and the considerable reduction of asbestos fibres concentration in the air).
- Serial number tags on RPE (not always mentioned).
- Sizes of RPE. Tutors did not always emphasise or explain that some full-face respirators are manufactured at different sizes. It is very important since it seems that employees may not be always issued with their own respirator.
- Gloves (not often used on-site according to TPs and very often not mentioned during the training courses).
- Significance of the NPU voltmeter and pressure gauges and what changes in the gauge readings mean.
- Barriers around enclosure.
- The concept of dead sheets and live sheets during the construction of enclosure. TP2 demonstrated perfectly this concept during the practical session on construction of enclosure and airlocks.
- Weather protection for enclosure. Some TPs emphasised the need for protection to adverse conditions (e.g. sun, wind, rain) and the difficulties and consequences associated (e.g. heat stress, collapsing of enclosures) with these conditions, others did not. Some TPs also covered work in hot condition stressing that it should be avoided by all means.
- Removal of non-licensed materials (e.g. cement roof floor tiles, gaskets etc...).
- Vacuum transfer and air management controlled stripping techniques. (Tutors usually considered these techniques as inefficient or problematic).
- Personal decontamination when hygiene facilities are directly connected to the airlocks of the enclosure.
- Guidelines on time for effective shower and decontamination.
- Emergency decontamination procedures. There is probably a need for guidance.
- Decontamination where no enclosure or DCU is required (open sites). None of the training providers explained these procedures. There is probably a need for guidance.
- Nailbrushes. Nailbrushes were not always mentioned during the lectures of decontamination procedures.
- Maintenance of equipment (except RPE). Tutors focused on the maintenance regime but in general, they did not demonstrate the maintenance of the multipoint injection equipment, NPUs, or H type vacuum cleaner. A video showing the use and maintenance of these types of equipment would be highly beneficial to the course and trainees' learning.
- Bagging, sealing and cleaning. Tutors usually did not describe and demonstrate how to close waste bags and explained briefly the procedures on the bagging of waste and removal of waste bags through the bag-locks using power-point slides. A practical session, a demonstration or alternatively a film showing these procedures would strengthen trainees' learning. Chapter 4 of the Licensed Contractors' Guide stipulates waste removal procedures

(by demonstration) as a core subject that must be provided in the form of a practical module (in accordance with L28).

- Correct loading of skip / van (only explained by TP2).
- Cleaning of enclosure in the event of an emergency.
- Methods of cleaning for enclosures equipment or common problems with cleaning of DCU. Tutors emphasised the importance of thoroughly cleaning the enclosure, equipment etc before the four-stage clearance assessment is carried out. However, in general, they did not or very quickly explain how to do it.
- Site inspections, site auditing role of inspectors / auditor.
- Faults findings. This topic (to spot problems associated with wetting of ACMs, RPE, enclosures, hygiene units) was generally only superficially covered due to a lack of teaching materials (faulty equipment, videos or power-point slides showing bad practices or problems). Only two training providers included fault finding exercise in their practical session on the use and maintenance of RPE.
- Practical session on controlled stripping techniques. This important topic was mainly delivered in a classroom environment using power-point presentations (see paragraph 3.1.5). Commercially available videos / DVDs on on-site controlled removal work would be highly beneficial to the course and trainees' learning.

Technical accuracy

In general, all training providers delivered the same information except for the instruction of transit and decontamination procedures, which varied from one training provider to the other.

For entering the enclosure, following transit procedures, trainees could, for examples, be told to:

- put on transit footwear in the clean area or in the dirty area;
- connect the RPE to the battery in the clean end or in the shower if the battery has not been connected in the clean end (some tutors omitted to mention the check of RPE motor / battery using the rotameter provided).

For leaving the enclosure, following transit procedures, trainees could, for examples, be told:

- **Option 1 - in the enclosure:** vacuum overalls and working footwear - **in the inner stage of the airlock:** wash footwear using a sponge and a bucket; remove overalls and working footwear; bag overalls; vacuum RPE, hair and body (e.g. neck) - **in the middle stage of the airlock:** wash RPE, hair and body (e.g. neck) - **in the outer stage of the airlock:** Put on transit overall and footwear; transit to hygiene facility with respirator on.
- **Option 2 - in the enclosure:** leave the enclosure without taking any action - **in the inner stage of the airlock:** vacuum overalls, RPE and working footwear; wash footwear in bucket 1; wash RPE in bucket 2 - **in the middle stage of the airlock:** remove overalls and working footwear, bag overalls - **in the outer stage of the airlock:** Put on transit overall and footwear / transit to hygiene facility with respirator on.
- **Option 3 - in the enclosure:** vacuum their overalls and working footwear, wash footwear - **in the inner stage of the airlock:** remove overalls and working footwear; bag overalls; vacuum RPE, hair and body (e.g. neck) - **in the middle stage of the airlock:** pass through middle stage into clean stage - **in the outer stage of the airlock:** Put on transit overall and footwear / transit to hygiene facility with respirator on.

- **In the shower, option 1:** cap filter of the RPE, rinse the RPE and head (10s under the shower), take battery and respirator off and then carry out full decontamination procedures.
- **In the shower, option 1:** step under the shower head down, wet head, RPE and body without wetting the battery, cap filter of the RPE, take battery and respirator off and then carry out full decontamination procedures.

In option 2, trainees were told to wash their footwear in bucket 1 and their RPE in bucket 2 placed in the inner stage of the airlocks. It is very poor practice to have these two buckets placed in the same compartment of the airlocks. Asbestos removal workers, fitted with full-face respirator, have a restricted vision and may wash their footwear in the bucket designated for RPE. Furthermore, TP3 recommended a garden spray for the washing of RPE in airlocks instead of a bucket since the concentration of fibres in the stagnating water increase with time.

Burdett G and Stacey P have shown that:

- "If gloves are not worn, the hands should be washed thoroughly once the working overalls and footwear have been removed but before changing in clean transit overalls and footwear to reduce the transfer of asbestos to the rest of the body. This requires that an additional bucket of clean water is present in the final stage of the three stage airlock. So that after washing off the respirator in the middle stage, the hands of the workers can be washed in clean water before dressing in transit overalls and entering the hygiene unit."
- "A three minute shower of 23 litres of water will remove around three quarters of the asbestos on the body. The shower procedure proved to be successful and although an absolute efficiency cannot be derived, it appears that in terms of the relative efficiency over 90% of $>5\mu\text{m}$ long and PCME fibres were removed during from the body after two showers."

Tutors did not advice on how to re-use capped "contaminated" RPE filters. TP3 recommended that RPE filters are disposed off at the end of each shift in the shower and are not re-used. There are questions to be answered: in which compartment of the hygiene unit should workers store the capped "contaminated" filters, and if they are re-used: in which compartment of the hygiene unit should workers insert the "contaminated" filters on their RPE; should they carry out the airflow test and 5 seconds interval leak test.

Amongst training providers, some discrepancies also appeared in the teaching of the use of towels in the hygiene units. For example, trainees could be told to:

- dry their body using disposable towels in the shower compartment of the DCU and dry again their body in the clean area using personal cotton type towels.
- dry their body using only disposable towels and only in the shower compartment.

Some TPs did not make any recommendations on the type of towels to be used.

Revell G (2002) has showed that:

- "Asbestos contamination was found on towels used by asbestos workers. Amosite asbestos fibre densities of up to 154 f/mm^2 were found on towels, intercepted before laundering. However, mechanical agitation in a rotating drum dustiness tester produced airborne fibre concentrations of less than 0.01 f ml^{-1} ."
- "Residual asbestos was found on towels after laundering. Although there was some evidence to indicate that asbestos fibre densities on heavily contaminated towels were reduced, the fibre levels on lightly contaminated towels appeared to be little changed by laundering. Airborne fibre levels inside the rotating drum dustiness tester were generally

very low ($< 0.01 \text{ f ml}$) but two towels, whose pre-laundering contamination levels were unknown, produced higher airborne fibre levels, 0.17 f ml^{-1} and 0.21 f ml^{-1} .”

- “Laundering was effective in removing asbestos from coveralls. Little or no evidence of asbestos was found after asbestos contaminated coveralls were laundered.”
- “Employers should ensure that asbestos workers decontaminate themselves thoroughly and properly, by taking sufficient time, care and attention, so that the decontamination process is effective.”
- “All workers should shower thoroughly and start the drying process in the shower section before returning to the clean end of the hygiene unit. Any towel taken into the shower section should be treated as contaminated and be either disposed of as asbestos waste, or bagged up for washing at a laundry, which has the facilities and expertise to launder asbestos contaminated items.”
- “Coveralls used during asbestos removal or renovation work should be treated as contaminated with asbestos and removed in the dirty end of the hygiene unit. These contaminated coveralls must either be disposed of as asbestos waste or bagged up for washing at a laundry, which has the facilities and expertise to launder asbestos contaminated items.”
- “Contaminated towels should be bagged and laundered separately to contaminated coveralls.”

3.2 NEW SUPERVISOR TRAINING COURSE

3.2.1 General results

A member of Inorganics & Fibres section attended an asbestos-removal training courses for new supervisor. The classroom activities and lecturing of this course took place at a hotel and the practical sessions were organised at a private company nearby (a manufacturer of equipment for the asbestos removal industry (e.g. hygiene units, multipoint injection system needle)).

This course was advertised as a new supervisor course and was attended by three employees needed to attend a new supervisor course with a ratio tutor to delegates of 1/3 for practical and theory sessions. These expected three days course was delivered in two and half days. The course duration (excluding written test assessment time and break) was approximately 11 hours. Some of this time is waiting time for trainees during the individual practice and assessment of decontamination procedures. As for new operative course, Chapter 4 of the Licensed Contractors’ Guide states a minimum of three days asbestos-removal training course for new supervisors and stipulates that: “a day’s training means at least 6 hours not including breaks”.

The training provider did not request from the employers or employees a training needs analysis neither did assess the trainees’ level of knowledge at the beginning of the course. It seemed that the tutor assumed that the new supervisors had already acquired most of the core topics for new operatives listed in the Chapter 4 of the Licensed Contractors’ Guide. The tutor had a fair knowledge of the asbestos industry.

The tutor asked the trainees about their previous work experience and established a friendly approach relationship with the trainees. However, the tutor was not particularly challenging the trainees by engaging in group exercise or discussion during this course.

At the beginning of the course, the tutor explained the organisation of the course, with the first day dedicated to the lecturing of new operatives knowledge, the second day to practical sessions and the third day (half a day) to the lecturing of additional information relevant to supervisor’s role.

The main teaching techniques used during this training course was lecturing (6 hours 40 minutes) and teaching through practical sessions (3 hours 35 minutes). The tutor dedicated a very limited amount of time for demonstration session (5 minutes) and classroom or group exercises (20 minutes) (see figure 13). The course did not include the projection of a video to illustrate or reinforce the teaching of the training.

The tutor had consulted the chapter 4 of the Licensed Contractors’ Guide and was aware of its contents and requirements.

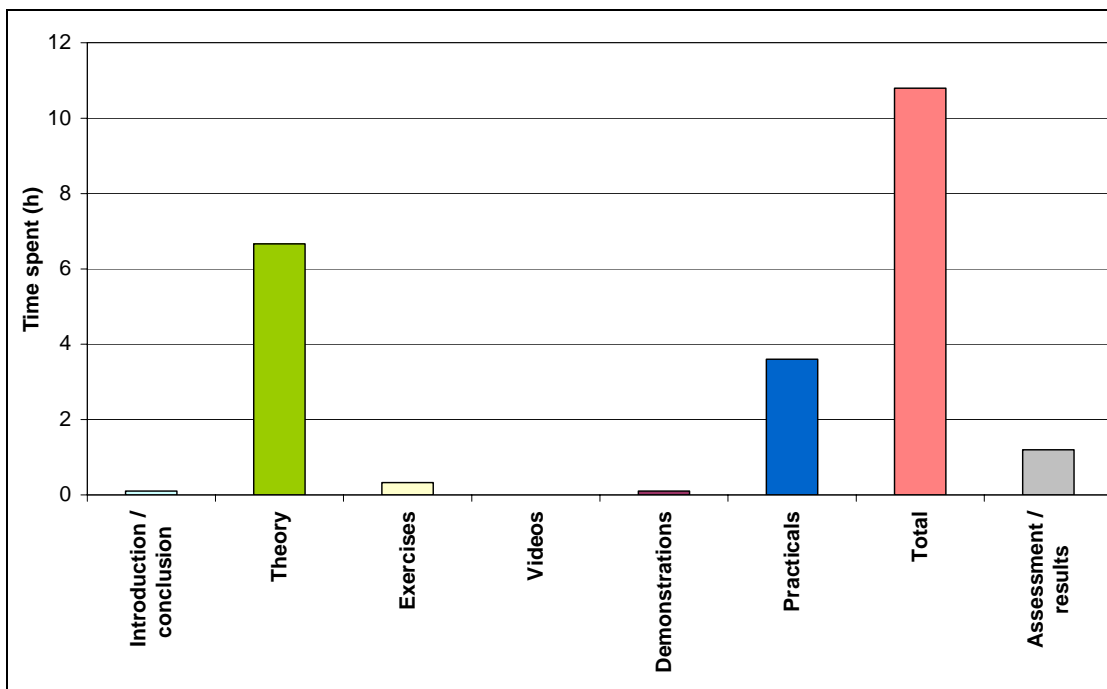


Figure 13. Duration of methods of teaching - New supervisors course

3.2.2 Classroom lecturing

Lecturing was the favoured method of teaching method taking 62% of the total course duration (6 hours 40 minutes). The tutor used acetate slides and the training manual to deliver the lectures.

The first day was dedicated to the lecturing of new operatives knowledge, and the third day (half a day) to the lecturing of additional information relevant to supervisor’s role. The lecturing of most of the modules did not exceed 20 minutes (see figure 14) with some essential core topics relevant to both supervisors and operatives being superficially covered. For example, the tutor spent 15 minutes on the lecturing of controlled stripping techniques, 20 minutes on waste bagging and disposal or cleaning and 10 minutes on clearance testing.

The following modules, more relevant to new supervisors, were also superficially covered:

- risk assessment and plan of work with a lack of emphasis on requirement to follow the plan of work and changes and amendments to risk assessment and plan of work;
- legislation;
- special waste regulation and waste management,
- emergency procedures and non-chemical hazards. The tutors emphasised on stopping work and investigate in the event of a ruptured enclosure or a failed negative pressure unit and the necessity to have emergency procedures in place at the beginning of the work.

The tutor dedicated 1 hour 5 minutes to the lecturing of site set-up and dismantling and also included practical session on the construction of enclosure and airlocks to complement the teaching of this module.

The lecture on RPE (35 minutes) was mainly focused on the type of full face and half face masks available, the circumstances where RPE must be worn, the need for fit-test, a good seal and the need to be clean shaven. The use and selection of gloves was not mentioned.

The tutors spent 20 minutes lecturing on the module “Transit procedures & decontamination modules” (compared to an average of 35 minutes for new operatives courses). Part of this module was also delivered using practical sessions and a paper exercise. The tutor did not cover or superficially covered the following: decontamination procedures where no enclosure or hygiene facility is required; emergency decontamination in case of evacuation or accident; common problems and faults findings with decontamination; air monitoring results in the hygiene facility.

During the lecturing of the course, the tutor covered satisfactorily the topics on record keeping, on-site documents, role of inspectors and site audits and clearly emphasised the role and responsibilities of the supervisor.

The tutor did not lecture on:

- module 19 (information, instruction and training) of the chapter 4 of the Licensed Contractors Guide;
- fault finding (only referred to a list in the training manual).

The tutor included lectures on work in hot conditions (20 minutes) and the use of scaffolds and related legislation (10 minutes).

The category “miscellaneous” in figure 12 refers to various topic of conversation (from trainers’ audit, price of insurance to UKAS analyst on site avoiding the decontamination procedures after carrying out the four-stage-clearance sampling inside the enclosure).

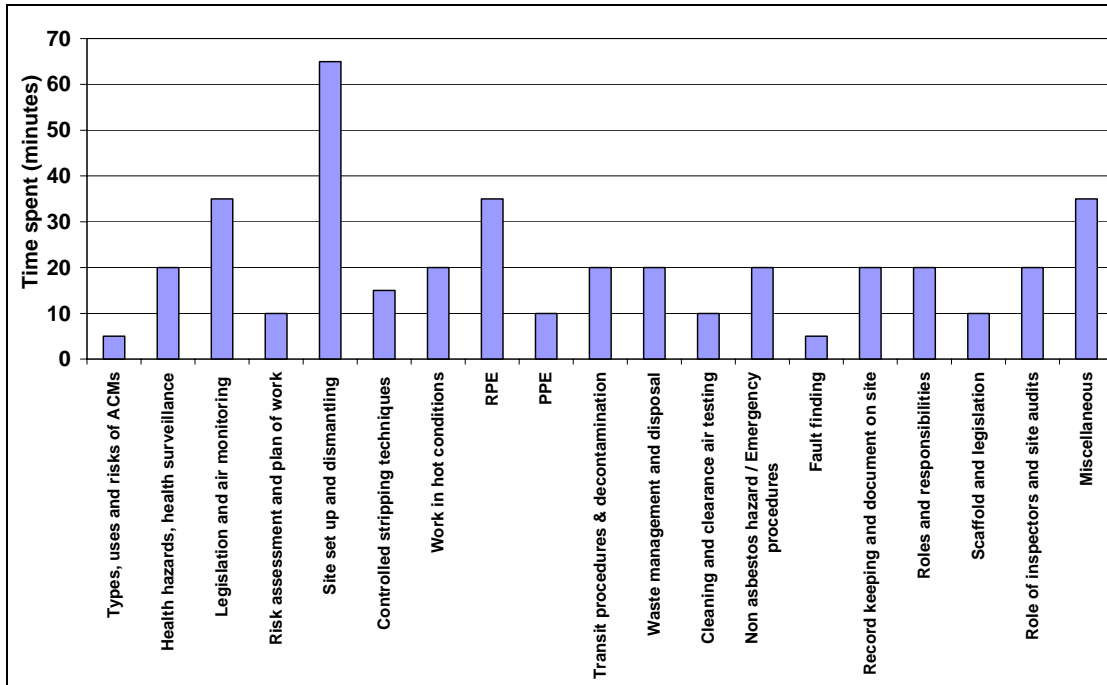


Figure 14. Modules lectured in the new supervisor course.

3.2.3 Practical, demonstration and exercise sessions

The practical sessions were introduced during the second day of the training course. The practical sessions were organised at a private company, which was also supposed to provide the space and the equipment (e.g. hygiene units, multipoint injection system needles) necessary to run these practical sessions.

Exercise session

The tutor included only a 20 minutes paper exercise during this three days course. The trainees were asked to list the procedures to enter and exit the work area including the decontamination procedures. The tutor checked the lists and re-explained any misunderstanding.

Practical sessions on transit procedures and decontamination

The practical session on transit procedures and decontamination ran for 1 hour 20 minutes. Each trainee had the opportunity to practice the procedures including personal decontamination. The duration of practice per trainee varied between 20 and 30 minutes.

The tutor did not assess the trainees' ability to carry out properly, on their own, the transit and decontamination procedures. In opposition to the teaching of the new operatives, during the practice the tutor instructed the trainees on the steps to be taken and did not leave them to carry out the procedures by themselves. The tutor did not check that trainees were following the correct decontamination procedures in the shower compartment of the hygiene unit during the practice of the procedures. The airlocks and the hygiene unit were not fully equipped with the essential items (e.g. buckets, nailbrush, towels, waste bags) necessary for a proper decontamination. The tutor did not provide impervious easily cleanable shoes to transit from the hygiene unit to the airlocks.

The tutor did not ask the trainees to set-up the hygiene facility (e.g. connect water and power, or level the decontamination unit). The tutor asked trainees to wait in the kitchen while the staff from the private company hosting the practical sessions connected the hygiene unit.

Practical and demonstration sessions on the use and maintenance of RPE

The tutor included a very short incomplete demonstration session on RPE (5 minutes) including:

- where to find the exhalation valve on a phantom full-face mask;
- how to check the flow rate using the flow tester.

During the session on transit and decontamination procedures, the trainees practiced the following tasks:

- to fit and wear a full-face mask;
- to carry out a 5 second interval leak test.

During this session, trainees did not check the flow rate of their RPE, filter and battery in the clean end of the hygiene unit and the tutors did not ask them to do it.

The practical session on RPE did not include essential training and exercises to enable supervisors to fulfil their role including:

- demonstration and practical sessions on the maintenance of a range of half-mask and full-face respirators;
- RPE fault finding exercise.

On site, RPE should be thoroughly examined and tested, by trained personnel, at least once a month to make sure that it is working properly to its design specification. It is generally the supervisor responsibility to carry out such check. Moreover, as shown in paragraph 3.1.5, operatives are not always trained to check and maintain properly their own respirators.

Practical session on construction of enclosure and airlocks

The practical session on the construction of enclosure and airlocks lasted 2 hours 15 minutes. All three trainees actively participated to the task, which include:

- the construction of a small enclosure using timber framework, polythene sheeting, adhesive tape and staples;
- the attachment of a pre-built airlocks to the enclosure (the trainees did not sheet the metal based airlocks, did not make /cut the doors and did not make / install weighted flaps). The trainees initially did not correctly attach the airlocks to the enclosure and had to reconnect them under the tutor's instruction (the flap between the enclosure and the airlocks could not move freely);
- the calculation of the capacity of the negative pressure unit needed to achieve 8 changes / hour of air in the constructed enclosure;
- the attachment of a negative pressure unit to the enclosure(one trainee was unsure about the positioning the NPU in regards with the airlocks);
- the smoke test of the enclosure.

Trainees agreed that the enclosure had not been meticulously sheeted.

Practical session on controlled stripping techniques

The tutor cancelled the session on controlled stripping techniques. The multipoint injection needles system normally supplied by the private company hosting the practical sessions had been sent to another client.

3.2.4 Overall results

It seemed that the tutor assumed that the new supervisors had already acquired most of the core topics for new operatives listed in the Chapter 4 of the Licensed Contractors Guide. This course could be defined as a diluted course for new operatives with limited additional knowledge relevant to the supervisors.

This new supervisors' course did not include fault-finding exercises or problem-solving activities as expected and allowed limited opportunities for group discussion.

3.3 ASSESSMENT

At the beginning of the course, the TPs also asked trainees if they had any difficulties in reading or writing which may affect their understanding of the lectures and of the questions in the written assessment. None of the trainees revealed reading or writing difficulties. Some trainees needed more time than others to complete the written exam. In general, tutors would read the questions if a trainee revealed he had literacy difficulties and would also allow delegates who fail the test to retake it.

All tutors assessed the trainees' attainment level using a multiple choice questionnaire type exam. Some tutors also included an assessment exercise on transit and decontamination procedures, which consisted of listing, in writing, on a diagram, the transit and decontamination procedures. The written test was either provided at the end of the lecturing, at the end of each day or at the end of each module.

In general, the multiple choice test exams consisted of 40 to 50 questions and three possible answers for each question (four answers for the exam provided by TP2), which in general represented a maximum of 4 or 5 questions per module. TP4 test exam included 24 questions on basic health and safety and 25 questions on the core topics for new operatives course. The test exam presented to the new supervisors included 50 questions covering the new operatives course and an additional 27 questions relevant to new supervisors roles. The written test exam lasted approximately 1 hour. The written assessment alone cannot provide a full picture and an objective judgment on the trainee's attainment level.

A few multiple-choice questions were badly phrased or were ambiguous. These questions are under review by the Asbestos Training Provider Working Group, which plan to produce a common database of questions.

The tutors sometimes left the classroom during the written exam and on some occasions trainees opened the training manual or helped each other and checked their answers. Some candidates were allowed to refer to their own notes but not their training manual. In two occasions, the trainees (including a trainee attending the supervisor course) copied the transit and decontamination procedures listed on their notes into their assessment exercise. At the beginning of the course, TP5's trainees were provided with a book exercise consisting of a training need analysis, classroom

exercises and the written test exam. The trainees were assessed against the completion of the classroom exercises and of the multiple choice test exam questions. After the exam, the trainees were left with their workbook while the tutor gave the correct answers of the multiple choice test questions and the trainees could potentially change their answers. The trainees were also allowed to bring the workbook at home at the evening.

Some tutors developed and used tick boxes checking lists during practical sessions to check that trainees met the expected requirements. The tutors recorded these results and some assigned a pass or fail mark for each practical sessions. A trainee, attending TP6's course, hesitated and carried out a few mistakes during the practice of transit and decontamination procedures. Consequently, TP6's tutor asked this trainee to re-practise the procedures to what he felt was a satisfactory level. In general, tutors individually assessed trainees' attainment level during the practical session on transit procedures and decontamination and three of the seven training providers used a checking list and recorded the trainees' performance. The two training providers, which included individual practical session on the use and maintenance of full-face respirators, also assessed the trainees' knowledge using a tick boxes checking list.

The Chapter 4 of the Licensed Contractors' Guide stipulates that: "The delegates should achieve 80% or more in the test to obtain a pass mark." and in general, trainees achieved at least 80%. Tutors would, however, usually give a pass to trainees achieving 75% or more. A tutor would give a pass mark at 70% and two tutors would give a pass mark to the written exam at less than 75% after analysis of the answers from the critical questions (e.g. questions related to transit procedures and decontamination, RPE, controlled stripping methods etc) and consideration of the trainee's performance and involvement during the practical sessions.

The written assessment alone does not provide a full picture and an objective judgment on the trainee's attainment level. The use of tick boxes checking lists during the practical sessions, the recording of these results and the assignment of a pass or fail mark for each practical session is an essential part of the assessment of the trainees' learning level and attainment. This assessment should be carried out on an individual basis for the practical sessions on transit and decontamination procedures as well as the use and maintenance of full-face respirators.

During the seven courses attended by a member of the Inorganics & Fibres section, no trainees failed the course.

3.4 FEEDBACK FROM TRAINEES

A feedback questionnaire was handed out at the end of the three days courses and 43 participants completed it. In general, the feedback from the trainees was very positive and most of the participants provided a positive respond or a high score to the questions (see appendix 5). Moreover, all new operatives felt quite or very confident to properly decontaminate themselves using a hygiene facility, to use their respirator properly or to enter the enclosure properly equipped and dressed. The new supervisors felt moderately to very confident to supervise operatives, to deal with situations where the methods set out in the plan of work cannot be followed or to deal with accidents and emergencies.

The questions, which did not score the highest mark, were:

- In answer to the question “*How did you find the training course? Too fast too slow - Just right*”, 16% of the participants assigned a score 2 or 3 on a scale of 1 to 5.
- In answer to the question “*How did you find the training course? Difficult to understand or follow - Easy to understand and follow*”, 14% of the participants provided a score 3 on a scale of 1 to 5.
- In answer to the question “*How did you find the training course? Boring - Simulating*”, 9% of the participants provided a score 3 on a scale of 1 to 5.
- To the question “*How much opportunities was there on the course to practice skills needed to remove asbestos safely?*”, 14% of the participants answered some or a little.

4 CONCLUSION

4.1 NEW OPERATIVES COURSES

In comparison to the course attended in April 2002, major improvements were found in the training of new asbestos removal operatives.

In general, the three days new operative training courses were very intensive since a lot of information had to be delivered in a short period of time.

All courses were role specific and usually complied with the tutor to delegate ratios (1 tutor for 12 delegates during the theory based sessions and 1 tutor for 6 delegates during the practical sessions).

The course duration (excluding written test assessment time and break) varied from 14 hours to 22 hours and five of the six training providers did not fully comply with the minimum of 18 hours of training.

All tutors had good knowledge, personal practical experience in the asbestos industry and demonstrated enthusiasm about the subject and in general the tutors established a friendly approachable relationship with trainees.

The courses were delivered using a variety of teaching methods. On average, lecture was the predominant method (about 7 hours) followed by teaching through practical sessions (6 hours), demonstration (1 hour 30 minutes), classroom exercises (about 1 hour) and projection of video (45 minutes). Some of the practical session time accounted for waiting time (e.g. in general trainees waited while their colleagues individually practised the transit and decontamination procedures). If this waiting time were not accounted for, few courses would comply with the 6 hours minimum practical hand on sessions.

Lecture

Training providers provided a lot of information through lecturing and these three days new operatives courses included very long intensive period of lecturing. The courses usually included limited opportunities for group discussion.

The time spent on each of the main modules varied from 70 minutes (site set and dismantling) to 15 minutes on waste management and disposal.

All tutors clearly explained and emphasised the operative roles and responsibilities in the asbestos removal industry throughout the course.

Tutors did not always explain the scientific concepts and trainees might have had difficulties to grasp and understand certain knowledge.

Audiovisual aids

The videos used during the training course of new operatives generally focused on the uses and health effects of asbestos, where asbestos can be found and regulations. Very few commercially available videos, if any, cover technical aspects of site work such as the use and maintenance of

RPE, the use of controlled stripping techniques, decontamination procedures, the bagging and removal of waste from enclosures.

Classroom paper exercises

In general, TPs included a very limited number of questions or problem solving exercises to the new operatives courses.

Practical and demonstration sessions:

- **Construction of enclosures and airlocks**
 - All TPs inserted group practical sessions on the construction of enclosures and airlocks (varying from about 1 hour to 7 hours) and trainees learnt to sheet an enclosure and airlocks, make doors and weighted flaps for the airlocks, attach a NPU and locate viewing panels and warning labels.
 - All trainees worked together and all tutors made sure that they all participated actively to the task.
 - All tutors demonstrated and explained the concept of negative pressure by running the NPU on the enclosure and five of the six TPs smoked tested the enclosure
 - One TP demonstrated the concept of dead sheet and live sheet (non-moving or moving sheet), a concept very often forgotten in these courses, and showed how to convert a live sheet into a dead sheet.
 - Very few TPs included a demonstration or practical session on H type vacuum cleaners or NPU by showing and explaining the different components and accessories.
- **Decontamination and transit procedures:**
 - All courses included individual practical sessions on transit and decontamination procedure. The duration of practice per trainee varied from 7 minutes to 35 minutes.
 - Trainees attending two of the six training providers courses did not have the opportunity to practice the full transit and decontamination procedures.
 - One training provider did not check that trainees were following the correct decontamination procedures in the shower compartment of the hygiene unit.
 - In general, trainees simulated very quickly pre-decontamination procedures in airlocks when leaving the work area and stayed under the shower for a very short period of time (1 - 2 minutes).
 - At least two training providers did not provide impervious easily cleanable shoes to transit from the hygiene unit to the airlocks. Nailbrushes were usually not present in the shower of the hygiene unit.
 - Most tutors assessed the delegates' attainment level using a tick box spreadsheet to ensure that all steps were followed correctly.

- Trainees were usually not asked to set-up the hygiene facility.
- Two tutors demonstrated part of the transit procedures to enter and exit work area (decontamination procedures by showering not carried out). In general tutors explained verbally the steps of the procedures in the classroom on power-point presentation.
- **Use and maintenance of RPE:**
 - Few trainees were fit tested and assigned with a full-face respirator before attending the courses.
 - Two of the six training providers included a fault finding exercise in their courses using several full-face masks or half masks having typical defects.
 - In general, all tutors demonstrated how to and trainees practised fitting and wearing a full-face mask, carrying out a 5 second interval leak test and checking flow rate using the flow tester.
 - Tutors did not always:
 - ask trainees to set-up correctly respirator, motor, belt, battery and filter and to check the flow rate of their RPE, filter and battery;
 - check that each trainee fitted their RPE in a correct manner ;
 - visually check that trainees achieved a good seal between the face and the RPE.
 - Four training providers carried out demonstrations on the maintenance of full-face and half masks using either a specific model or a range of RPE. The duration of this session varied from 15 minutes to 1 hour.
 - Trainees attending two of the six new operatives courses practised on an individual basis the maintenance of a full-face mask and the tutors assessed the delegates' attainment level using a tick box spreadsheet to ensure that all steps were followed correctly. The duration of this practical session per delegate lasted approximately 15 minutes.
 - One training provider demonstrated and explained how to correctly wear RPE and PPE (e.g. full-face respirator, coveralls, boots) and how to remove coveralls at the end of a shift.
- **Use of controlled stripping techniques**
 - The important topic on the use of controlled stripping techniques was mainly delivered through lecturing using power-point presentation.
 - The practical session on use of controlled stripping techniques was mainly delivered by demonstration and one training provider did not provide demonstration or practical session on controlled stripping techniques.
 - The duration of demonstration on the multipoint needles injection system varied from 5 minutes to 1 hour 10 minutes.

- Two training providers carried out demonstrations on how to remove a substitute non-asbestos material board screwed to timber framework of the enclosure using spray wetting and shadow vacuuming. Only one training provider included an individual practical session on this technique (duration of 10 minutes per delegate).
- **Waste bagging and disposal**
 - No training provider included a demonstration or practical session on the bagging of waste and the removal of waste bags through the bag-locks. These procedures were only briefly explained during the lectures using power-point slides.

Overall core topics

Five of the six training providers' tutors had consulted the chapter 4 of the Licensed Contractors Guide and were aware of its contents and requirements and covered in more or less depth and detail the core topics listed in chapter 4 of the Licensed Contractors' Guide.

In general, all training providers delivered the same information except for the lecturing of transit and decontamination procedures.

Due to a lack of teaching materials and the limited amount of time after the lecturing and the running of the practical sessions, the topic on "fault finding" was generally superficially covered.

4.2 NEW SUPERVISORS COURSE

These results are based on a single new supervisors course attendance and may not be representative of the delivery of new supervisors courses.

The course was role specific and complied with the tutor to delegates ratio. The course duration was approximately 11 hours (excluding written test assessment time and break) and did not comply with the minimum of 18 hours of training.

The tutor dedicated a very limited amount of time for demonstration session (5 minutes) and classroom or group exercises (20 minutes). The course did not include the projection of a video to illustrate or reinforce the teaching of the training. This new supervisors' course did not include fault finding exercises or problem-solving activities as expected and allowed limited opportunities for group discussion.

Lecture

The lecturing of most of the topics did not exceed 20 minutes with some essential core topics and modules more relevant to new supervisors being superficially covered. The tutor did not lecture on module 19 (information, instruction and training) and on fault finding.

Practical and demonstration sessions

The duration of the practical sessions was 3 hours 35 minutes including waiting time during individual practice of the transit and decontamination procedures. This course did not comply with the minimum 6 hours practical session.

- **Transit and decontamination procedures**
 - Each trainee had the opportunity to practice the procedures including personal decontamination. The duration of practice per trainee varied between 20 and 30 minutes.
 - The tutor instructed the trainees on the steps to be taken. He did not leave them to carry out the procedures by themselves and therefore did not assess the trainees' ability to carry out properly, on their own, the transit and decontamination procedures.
 - The airlocks and the hygiene unit were not fully equipped with the essential items (e.g. buckets, nailbrush, towels, waste bags) necessary for a proper decontamination.
 - The trainees did not set-up the hygiene facility
- **Use and maintenance of RPE**
 - The tutor included a very short incomplete demonstration session on the use of RPE (5 minutes).
 - The tutor did not include essential practical sessions on the maintenance of a range of full-face masks to enable supervisors to fulfil their role once on asbestos removal site.
- **Practical session on construction of enclosure and airlocks**
 - All three trainees actively participated to the task on the sheeting of an enclosure and the attachment of pre-built airlocks and NPU (2 hours 15 minutes). (Trainees agreed that the enclosure had not been meticulously sheeted).
- **Controlled stripping techniques and waste bagging and disposal**
 - This course did not include demonstration or practical session on controlled stripping techniques and waste bagging and disposal.

Overall conclusion

It seemed that the tutor assumed that the new supervisors had already acquired most of the core topics for new operatives listed in the Chapter 4 of the Licensed Contractors' Guide. This course could be defined as a diluted course for new operatives with limited additional knowledge relevant to the supervisors.

4.3 ASSESSMENT

All tutors assessed the trainees' attainment level using a multiple choice questionnaire type exam and some tutors also included a written assessment exercise on transit and decontamination procedures.

In general, the candidates did not refer to their training manual to complete the multiple choice questionnaire type exams. However, some TPs allowed them to use their notes.

The trainees were sometimes left unattended during the written tests assessments and on some occasions trainees exchanged answers or copied the transit and decontamination procedures listed on their notes directly into their assessment exercise.

Some tutors assessed and recorded the performance and attainment levels of trainees during the practical sessions as well as assigned a pass or fail mark for each practical sessions.

The written assessments alone cannot provide a full picture and an objective judgment on the trainee's attainment level.

In general, the tutors would:

- read the questions if a trainee revealed he had literacy difficulties;
- give a pass mark to the multiple choice questionnaires type assessment if a trainee achieved 75% or more;
- allow trainees who fail the test to retake it.

During the seven courses attended by a member of the Inorganics & Fibres section, no trainees failed the course.

5 REFERENCES

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6 APPENDICES

6.1 APPENDIX 1- CHECKLIST (1) - GENERAL CHECK LIST

- Training provider:
- Course Title:
- Date:
- Duration of course: hours of training & hours of assessment:
- Theory based session: ratio tutor / delegates:
% of course theory based:
- Practical sessions: ratio tutor / delegates:
% of course practical based:
- Roles of delegates (new asbestos workers vs. experienced trainees, who need to attend a refresher course):
- Any additional specific modules incorporated: e.g. scaffolding:

6.2 APPENDIX 2 - CHECKLIST (2) - TRAINING DELIVERY

Course details: Training provider - Course Title - Date

At the beginning of the course:

1. Did the training provider establish existing experience/knowledge i.e. conduct a brief Training Needs Analysis (TNA)? Yes No
(Could ask if received anything from Employer)

a. If yes, how? (e.g. asked delegates what previous experience they had in the industry or a similar industry, asked delegates if they have any difficulties that may affect their understanding of the course e.g. English not first language, asked delegates if there was anything on the course they were particularly having a problem with or were concerned about etc)

2. Did the trainer highlight the course objectives at the start of the course? Yes No
a. What were they?

3. Was it clear how the training would be organised? Yes No

During the course:

4. Did the trainer check delegates' level of understanding during the course? Yes No
a. If yes, how? (e.g. asked delegates if they had understood the previous information, test them at the end of each session, provide opportunity for questions etc)

5. Did the trainer appear to adapt the training at any point to accommodate different needs? Yes No

a. If yes, how? (e.g. explaining things again if people did not appear to understand, use examples specific to the type of work the individuals carried out, increase length of practical sessions as a result of a particular need, etc)

6. Did the trainer appear to make an effort to motivate delegates? Yes No

a. If yes, did they use any of the following methods?

Variation of delivery methods

Training objectives relevant to delegates roles and work

Encouraged group discussion

Provided feedback on progress by means of assessment

Explain the importance of understanding the course material

7. Did the trainer put the sessions in the context of the job? Yes No

a. If yes, briefly describe how? (e.g. explained when you need to use different types of equipment)

8. Did the trainer consistently encouraged trainees to participate and contribute to sessions?

Yes No

a. If yes, how?

On a scale of 1-5 please rate the following from good to poor, where 1 = very good and 5 = very poor:

9. How clear and relevant the visual aids were

10. The appropriate level of detail on any handouts

11. The appropriate arrangement of the training room (e.g. did it provide enough space for practicals, could everyone see any visual aids, or hear what was said)

12. How enthusiastic the training provider came across

13. The technical accuracy, relevance and completeness of material taught

14. Whether the course was divided into appropriate and manageable 'chunks' of learning

15. How well the trainer listened and respond to questions and concerns

16. The knowledge of the training provider

At the end of the course:

17. Did the trainer highlight key learning points? Yes No
18. Did the trainer revisit the objectives from the start of the course to ensure they had been met? Yes No N/A
19. Did the trainer provide sufficient time to cover all the topic sufficiently or made sensible decisions about time allocation to meet trainees needs? Yes No
20. Was the trainer sensitive and constructive when giving feedback on trainees' skills and knowledge? Yes No
21. What further support / feedback could the trainer have provided during the course? (*e.g. feedback on practical exercises, feedback on tests - did the trainer go through wrong answers and explain why they were wrong?*)

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6.3 APPENDIX 3 - CHECKLIST (3) - ASSESSING TECHNICAL CONTENT - THEORY BASED SESSION

Modules	Subtopics	Total duration	Subtopics uncovered	Type of delivery* + duration	Trainees involvements (Yes / No) + Comments
Module 1	<ul style="list-style-type: none"> • Subtopic 1 • Subtopic 2 • Subtopic 3 etc... 				
Module 2	<ul style="list-style-type: none"> • Subtopic 1 • Subtopic 2 • Subtopic 3 etc... 				
...	...				

* Lecture, demonstration, video, anecdote, questions to trainees / discussion, group exercises, individual exercises, practicals (if practicals see sheets 2).

6.3.1 Operative theory based session

- **Module 1: Types, uses and risks of ACMs**
- Subtopics:
 - Types of asbestos fibres - characteristics, uses, identification methods (intro).
 - History of import, manufacture and installation of different ACM's; types of products that may contain asbestos; likely locations; previous treatment methods covering old asbestos applications.
 - ACMs friability / conditions when they will release fibres; nature and levels of risk for different groups of ACM's.
- **Module 2: Recognition and need for control; emergency and remedial work**
- Subtopics:
 - Health hazards of asbestos
 - How fibres cause disease; types of asbestos related diseases.
 - How diseases are related to exposure.
 - Medicals surveillance.
 - Need for dust / fibre suppression to control exposure.
 - Need for correct use / maintenance of RPE.
 - Health effects of smoking or risks of taking home asbestos-contaminated equipment / clothing etc.
- **Module 3: Legislation**
- Subtopics:
 - Duties of the individual; key duties of the employer.
 - Overview of Licensing framework; overview of CAWR 2002; requirements of ACoP L28 and associated guidance; overview of Special Waste Regulations & Environmental Protection Act.

- Control of exposure - low as 'reasonably practicable'; Action levels and Control Limits.
- **Module 4: Site set up & dismantling**
- Subtopics:
 - Site set up:
 - Need for pre-clean; vacuum cleaners.
 - Site layout, including siting of hygiene unit as close to enclosure as possible; optimal positioning of air/baglocks and negative pressure units.
 - Explanation of how negative pressure units work and the significance of the voltmeter and pressure gauges and what changes in the gauge readings mean; when pre-filters should be changed; strategy for calculating air changes.
 - Connection and testing of hygiene unit.
 - Construction of enclosures, air/baglocks including possible weather protection; positioning of clear viewing panels; positioning and wording for warning notices and barriers; how to delineate work areas and transit routes; smoke testing and need for witnessing.
 - Maintenance:
 - Daily inspections of enclosure (start, middle & end of shift) and immediate rectification of defects.
 - Strategy for negative pressure units to be kept running after stripping finishes for the day.
 - Dismantling:
 - Once clearance achieved, spray enclosure with sealant, bag and seal vacuum cleaners, bag other equipment, dismantle polythene and dispose of as asbestos waste.
 - Final inspection of area once enclosure and all associated equipment have been removed.
- **Module 5: Controlled stripping techniques**
- Subtopics:
 - HSG189/1 in detail including principles of fibre suppression and control of exposure; equipment - use of, maintenance and cleaning; wet injection & spraying techniques; wrap & cut; glove bags; direct vacuuming (shadow vac); LEV; vacuum transfer; air management.
 - Preparation time & testing of controls prior to removal; wetting liquids selection, preparation and use; COSHH requirements.
 - Anticipated and desired fibre levels and comparison with RPE maximum exposure levels; personal assessment monitoring (principles); access to personal assessment information.
- **Module 6: Respiratory Protective Equipment**
- Subtopics:
 - The circumstances when RPE must be worn, which may include: inspection of work area, building enclosures, working in enclosure, taking bags to skip.
 - How to inspect, test and wear respirator.
 - Need for quantitative face-fit test, a good face seal and the need to be clean shaven. Correct storage, battery charging and keeping clean.

- Strategy for changing pre-filters and main filters.
- **Module 7: Personal Protective Equipment & Clothing**
- Subtopics:
 - The use of the appropriate PPE including: overalls, headgear, footwear and gloves; transit overalls; when and where PPE should be worn; ensure correct use and maintenance of PPE.
 - Employer requirements to provide appropriate PPE and employees obligations to use it.· Care, wearing, cleaning, decontamination and/or disposal of PPE.·
 - Not to take contaminated PPE home.
- **Module 8: Transit procedures and decontamination**
- Subtopics:
 - Personal decontamination procedures for directly connected and remote (transit) DCUs and airlocks including: PPE changing and disposal, showering, colour coding of coveralls, RPE decontamination, cleaning, charging and storage.
 - Use of towels.
 - Changing and disposal of pre & main RPE filters.
 - Decontamination procedures where no enclosure or DCU is required (open sites).· Common problems with decontamination; cleaning of airlocks and DCUs.· Emergency decontamination in case of evacuation or accident; · What should be in the decontamination unit ie mirror, shower gel.
- **Module 9: Cleaning and clearance air testing**
- Subtopics:
 - Cleaning and clearance requirements including the need for the 4 stage clearance process and associated certificate of reoccupation.
 - Methods of cleaning for enclosures, hygiene facilities and equipment; re-cleaning in event of air test failure.· Visual cleanliness and air testing requirements.·
 - Cleaning after enclosure dismantling.
 - Cleaning in event of emergency or enclosure/equipment damage.
- **Module 10: Plant & Equipment (using demonstration of equipment)**
- Subtopics:
 - Equipment components; equipment use and maintenance including: negative pressure units, H Type vacuums and injection equipment. (RPE covered separately).
- **Module 11: Waste management & disposal**
- Subtopics:
 - Bagging, sealing and cleaning.
 - Transportation through bag lock and airlock.·
 - Storage of asbestos waste; correct loading of skip/van.
- **Module: 12 Emergency Procedures**
- Subtopics:
 - What to do in the event of major and minor injuries or illnesses occurring inside 'live' enclosures.

- What to do in the event of fire, or some other hazardous release such as toxic gas or radioactive dust occurring inside or outside enclosure; what to do if leak of asbestos found outside enclosure.
 - What to do if power on power assisted respirator fails while inside 'live' enclosure.
 - What to do if the negative pressure units stop working.· What to do if there is complete loss of electrical power.
 - What to do if loss of water supply to hygiene unit.
- **Module 13: Non asbestos hazards**
 - Subtopics:
 - Site safety procedures; entry and exit in case of fire; location of possible site hazards.
 - Emergency procedures in case of fire, electric shock, burns, hazardous substances, solvents etc. Care of injured casualty; manual handling, noise, vibration and falling object protection, slips, trips and falls, e.g. working from scaffolding.
- **Module 14: Faults finding**
 - Subtopics: How to spot problems with wetting of ACMs, RPE, airlocks, enclosures and hygiene unit.
- **Module: 15 Roles & Responsibilities**
 - Subtopics:
 - To adhere to the principles of their training.
 - To work to the assessment and plan of work (POW), when work should be halted because it does not match the POW.
 - To work safely and not to put others at risk from their acts or omissions.· To wear PPE and RPE correctly and to report any defects.· To understand why they should not take short cuts.
- **Module 16: Site inspections and record keeping**
 - Subtopics: Purpose of site inspections, site auditing and record keeping; role of inspector/auditor.· Responsibilities of operatives; reporting faults and other problems.
- **Module 17: Management systems & monitoring**
 - Subtopics:
 - Maintenance and monitoring of control measures; ensuring that equipment functions correctly.
 - Controlling exposure to asbestos.
 - Pre-start setting-up; barriers and signs; construction and testing of enclosures and air locks; site monitoring; use/testing of negative pressure equipment and ventilation and air management systems
 - Correct maintenance of all site equipment - following manufacturers operating instructions, including the correct maintenance and monitoring of the following control measures: enclosures, external services, NPU, wet strip units, mobile generators, water supply, heating appliances, PPE, RPE, any dust suppression equipment, tools and decontamination unit.
- **Module 18. Risk assessments (RA) and plans of work (POW)**

- Subtopics:
 - Introduction to risk assessments (RAs)(know what its for) - understanding the main points, right to see significant findings.
 - Requirements to follow RAs and risks/penalties if not followed; the meaning of the control limits and action levels.

6.3.2 Supervisor additional theory based session content

- **Module 1: Types, uses and risks of ACMs**
 - Additional subtopics: How to confirm the presence of asbestos.
- **Module 3: Legislation**
 - Additional subtopics: Emphasis on responsibilities of supervisors.
- **Module 4: Site set up & dismantling**
 - Additional subtopics: ACMs not being removed as agreed with client. Certificate for hygiene unit (DOP, gas test, clearance in shower & dirty end from previous job), negative pressure units and vacuum cleaners. How to check for negative pressure in the enclosure. Provision of viewing panels or some other means of communication
- **Module 5: Controlled stripping techniques**
 - Additional subtopics: Equipment inspections and records, faults finding and solutions. Monitoring for effectiveness of fibre control techniques and recording information.
- **Module 6: RPE**
 - Additional subtopics: PPE use during transit procedures. Contaminated clothing and waste. Records keeping.
- **Module 7: PPE & clothing**
 - Additional subtopics: PPE use during transit procedures. Contaminated clothing and waste. Records keeping.
- **Module 8 Transit procedures and decontamination**
 - Additional subtopics: Common problems and fault finding with decontamination. Inspection checks and air monitoring results in DCUs. Record keeping. The importance of ensuring that procedures are followed and time to allow adequate showering;
- **Module 9: Cleaning and clearance testing**
 - Additional subtopics: Cleaning and clearance requirements. Associated certificate of reoccupation and the requirements before clearance sampling.
- **Module 10: Plant & Equipment (using demonstration of equipment)**
 - Additional subtopics: Daily maintenance of hygiene units. Record keeping.
- **Module 11: waste management & disposal**

- Additional subtopics: Special Waste Regulations. Use of consignment notes. Registration of carriers. Role and powers of environment agencies. Transportation of dangerous goods;
- **Module 12: Emergency procedures:**
 - Additional subtopics: Responsibility of the supervisor to ensure that suitable emergency procedures are in place
- **Module 13: Non asbestos Hazards**
 - Additional subtopics: Electrical check for DCU
- **Module 14: Faults finding**
 - Additional subtopics: method statements; risk assessments; signs; record keeping and fault reporting procedures.
- **Module 15: Roles and responsibilities**
 - Additional subtopics: To ensure everyone complies with regulations, ACOPs, guidance and follows the assessment and plan of work. If the work method has to change - work is stopped and reassessed. Amendment of assessment & plan of work. To inform personnel of the changes to assessment & plan of work. To ensure all personnel are instructed, face-fitted and have received a medical; all equipment is inspected and tested; all daily inspections are carried out; all documentation is available and up to date. The importance of being on site for key stages of the work and their crucial role in directing the work and monitoring standards of work.
- **Module 16: Site inspections and record keeping**
 - Additional subtopics: Criteria for site inspections actions in events of fault record keeping.
- **Module 17: Management system & monitoring**
 - Additional subtopics: Site supervision and record keeping of work in progress. Method statements. Plans of work. Monitoring and auditing work in progress.
- **Module 18. Risk assessments (RA) and plans of work (POW)**
 - Additional subtopics: RAs and developing a POW (instruction and exercise). Changes and amendments to RA/POW. To seek advice and informing of changes. Significant changes and notification to HSE.
- **Module 19 Information, Instruction & Training**
 - Subtopics: How to implement and monitor on-job training (consolidation). How to assess the competence of employees. The types of training available and how to choose the right course. Training Needs Analysis in practice. Recognising the need for additional training when new equipment or work methods are introduced.

6.4 APPENDIX 4 - CHECKLIST (4) - ASSESSING PRACTICALS - OPERATIVES AND SUPERVISORS

Practicals	Examples of practicals	Practicals (Yes / No) - Duration	Description of practicals	Trainees involvements - Comments	% of trainees involved
A. The use of decontamination facilities	<ul style="list-style-type: none"> • Carrying out decontamination procedures using powered live hygiene unit. 				
B. The use and fitting of PPE and RPE	<ul style="list-style-type: none"> • Trying out PPE. • Trying out RPE to ensure a good face fit. • Carrying out maintenance check on RPE. • Changing pre-filters and main filters. 				
C. The use of controlled stripping techniques	<ul style="list-style-type: none"> • The simulated use of controlled wet stripping techniques (e.g. multi needle injection system, spraying techniques, wrap & cut, glove bags, use of H type vacuum cleaners...) 				
D. Construction of enclosures and air locks	<ul style="list-style-type: none"> • Construction of a mini enclosure. • Construction of an airlock 				
E. Waste removal procedures	<ul style="list-style-type: none"> • Bagging, sealing and cleaning. 				

6.5 APPENDIX 5 - ASSESSMENT OF TRAINEES' PERFORMANCE

1. When and duration of assessment (every day or at the end of the course, how long).
2. Type of assessment (only one type of assessment or a mixture of assessment including, multiple-choice questionnaire, oral assessment, assessment based on performance during practicals - *describe how assessed*).
3. Exam condition (are workers allowed to communicate during exam (e.g. check answers with neighbors), do workers have access to training manual during assessment).
4. For multiple-choice questionnaire, assessment of type of question and how many for key topics (e.g. PPE / RPE, decontamination procedures, controlling exposure to asbestos, cleaning and clearance procedures...).
5. What was the pass mark on any written tests, if appropriate?
6. A. Did any of the trainees reveal they had learning difficulties?
B. Was an oral test offered to these delegates?
7. What type of feedback were trainees given (e.g. if poor performance in practicals – how to correct it, or what the correct answers were to multiple choice questions and reasons why)
8. Number of trainees, who failed the exam (information from training providers after courses).
9. What is the procedure for anyone who failed the test? e.g. chance to re-sit, no certificate given etc

6.6 APPENDIX 6 - FEEDBACK QUESTIONNAIRE

6.6.1 Feedback questionnaire for new operative trainees

Course Title: New Asbestos operative Training provider: Date:
Training course evaluation

We are evaluating the training course you have just completed. It would really help us if you could answer the following questions.

1. How did you find the training course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Boring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stimulating
Difficult to understand and follow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Easy to understand and follow
Too fast or too slow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Just right

2. How much OPPORTUNITY was there on the course to: (please tick one box)

	None at all	A little	Some	Quite a bit	A lot
Discuss issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practice skills needed to remove asbestos safely?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ask questions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How well were your QUESTIONS ANSWERED? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Not very well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very well

4. How much did you LEARN from the course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Nothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A lot

5. How CONFIDENT do you feel, now, that you will be able to: (please tick one box)

	Not at all	Slightly	Moderately	Quite	Very
Properly decontaminate yourself using a hygiene / decontamination unit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use your respirator properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enter an enclosure properly equipped & dressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. What is your OVERALL RATING of this course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excellent

7. Would you recommend this course to a colleague?: Yes No

Any comments or anything missing from the course:

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Thank you very much for your help

6.6.2 Feedback questionnaire for new supervisor trainee

Course Title: New Asbestos supervisor Training provider: Date:
Training course evaluation

We are evaluating the training course you have just completed. It would really help us if you could answer the following questions.

1. How did you find the training course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Boring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stimulating
Difficult to understand and follow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Easy to understand and follow
Too fast or too slow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Just right

2. How much OPPORTUNITY was there on the course to: (please tick one box)

	None at all	A little	Some	Quite a bit	A lot
Discuss issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ask questions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practice skills needed to carry out effectively your supervisory role on site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How well were your QUESTIONS ANSWERED? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Not very well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very well

4. How much did you LEARN from the course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Nothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A lot

5. How CONFIDENT do you feel, now, that you will be able to: (please tick one box)

	Not at all	Slightly	Moderately	Quite	Very
Supervise operatives on asbestos removal sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deal with situations where the methods set out in the plan of work cannot be followed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deal with accidents and emergencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. What is your OVERALL RATING of this course? (Please rate on a scale of 1-5)

	1	2	3	4	5	
Poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excellent

7. Would you recommend this course to a colleague?: Yes No

Any comments or anything missing from the course:

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Thank you very much for your help