

**Safe and Environmentally Sound Ship Recycling
SENSREC, WP4, Part 2**

REPORT:

**STRATEGY FOR SUSTAINABLE TRAINING FOR
THE SHIP RECYCLING INDUSTRY**

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DOCUMENT AUTHORS: STUART A. MCKENNA, RAPHAEL BAUMLER & RAFET E. KURT

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ABSTRACT

As part of the tender ITT2016-04 'Development of Training for Health, Safety and Environmental Compliance - Development of Training Material Work Package 4, Part 2', the ACS Consortium present a 'Strategy for Sustainable Training for The Ship Recycling Industry'. This strategy has been created through a combination of the ACS Consortium's expertise and knowledge in vocational education and training provision and the unique insights gained in this projects training needs analysis phase (Final Report of Safe and Environmentally Sound Ship Recycling SENSREC, WP4, Part I) and training piloting activities.

Within this report, a set of recommendations have been presented which are designed to assist and guide the responsible persons/appropriate authorities in creating a roadmap for implementing a sustainable training programme for the ship recycling industry in Bangladesh.

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List of Abbreviations

BMA	Bangladesh Marine Academy
BSBA	Bangladesh Ship Breakers Association
BSRB	Bangladesh Ship Recycling Board
BUET	Bangladesh University of Engineering and Technology
CPD	Continued Professional Development
CPR	Cardiopulmonary Resuscitation
ID-Card	Identity Card
NGO	Non-Government Organisation
PPE	Personal Protective Equipment
SBRR	Ship Breaking and Recycling Rules
SENSREC	Safe and Environment Friendly Ship Recycling Project
STCW	Standards of Training, Certification and Watch Keeping for Seafarers
UoC	University of Chittagong
WMU	World Maritime University

1 Introduction

As part of the tender ITT2016-04 'Development of Training for Health, Safety and Environmental Compliance - Development of Training Material Work Package 4, Part 2', the ACS Consortium was primarily tasked with the development and piloting of vocational training materials for the Bangladeshi ship recycling industry.

To ensure that the created outputs will be utilised in a sustainable manner, an additional requirement of the tender was to develop a training strategy. This training strategy was instructed to focus on awareness raising, up-scaling and sustainability with the purpose of supporting the relevant stakeholders in Bangladesh who are now tasked with exploiting the created training materials.

Within this Training Sustainability Strategy, the ACS Consortium have utilised their extensive knowledge and familiarity of effective vocational education and training provision and the Bangladeshi ship recycling industry to provide practical recommendations in assisting those tasked with creating a roadmap in the delivery, administration and management of a sustainable ship recycling training programme.

2 Methodology

The practical recommendations included within this report are based on the following key sources of expertise or resources:

- **Expertise in vocational education and training provision** – The ACS Consortium includes institutions such as the BMA, BUET, UoC, WMU and Strathclyde University, of whom have many years of experience in delivering high quality vocational training based on international standards.
- **Final Report of Safe and Environmentally Sound Ship Recycling SENSREC, WP4, Part I** – An in-depth investigation has previously been delivered in Part 1 of WP4. The recommendations from this report have been updated, if required, and utilised within this report.
- **Feedback and lessons learned from piloting activities** – The invaluable lessons and feedback obtained during the piloting activities have added the 'practical realities' of the complicated state of affairs of the Bangladeshi ship recycling industry to the recommendations of this training strategy.
- **The Ship Breaking and Recycling Rules, 2011 (SBRR)** – The rules provide numerous orientations on the supervision of ship recycling activities.

DISCLAIMER: The recommendations and proposals of this Training Sustainability Strategy are intended as guidance only to those tasked with creating a roadmap for a sustainable ship recycling training programme in Bangladesh. Further analysis, costings and due diligence on any recommendations and/or proposals within this report is advised.

3 Background

3.1 Bangladesh Ship Recycling Worker Estimates

25,000 – 40,000 full-time workers¹ have been estimated to be working in the Bangladeshi ship recycling zone at any one time. The ship recycling and shipping markets as well as steel markets have considerable influences on the number of workers employed.

Often employed by subcontractors, this workforce has been identified to be predominately migrants from other regions of Bangladesh and likely to enter and exit the sector frequently over time.

Consequently, the estimate of those active within the industry, and therefore required to be trained, could be potentially higher than the estimates once the high worker turnover rate is factored in.

3.2 Mandate for Ship Recycling Training

The Bangladeshi Honourable High Court has made the stipulation that all those employed in ship recycling activities require to be trained according to the following decree:

“A system of comprehensive training must be introduced to impart training to those who shall be employed for ship breaking activities. An Institute will be set up for the training purposes by BSBA at their cost for training such persons. The training period shall be at least 3 months duration. First 20 days shall be allocated for theoretical training, while the rest of the period shall be involved in practical vocational courses. No workers shall be allowed to be employed in the ship breaking yards without certificate showing completion of the course (Honourable High Court Verdict on 6/4/11, regarding workers training)”

In WP4, Part I of the SENSREC project, this was interpreted into an approved curriculum which recommended:

- Theoretical training (in training facilities) of 3 weeks/15 full days
- Practical vocational training (on the job training) of 47 days

For the theoretical training, eight modules were developed to be delivered over the course of 3 weeks:

- MODULE 1 - Ship Recycling Administration and Regulative Framework
- MODULE 2 – Job Hazard Awareness – Hazard and Risks
- MODULE 3 – Environmental Awareness
- MODULE 4 – Inventory of Hazardous Materials (IHM)
- MODULE 5 – Personal Protective and Safety Equipment
- MODULE 6 – Worker Wellbeing and Health
- MODULE 7 – Awareness and Handling of Hazardous Materials
- MODULE 8 – Vocational Education and Training

These modules are expected to be delivered in a mixture of classroom and practical based activities with the following minimum time recommended:

- Classroom activities for all workers (theory part 1):
 - Common training for all workers = 48 hours

¹ SENSREC WP1 Final Report: Contributions of Ship Recycling in Bangladesh: An Economic Assessment

- 1 or 2 hours of theory for workers engaged in specific occupations (e.g. cutter team 2 hours and fitter team 1 hour)
- Practical activities for all workers (theory part 2):
 - One day on emergency escape, rescue and entry in enclosed spaces
 - Two days on firefighting techniques
 - One day on first aid
 - One day on chemical/oil spill management
 - One day handling of hazardous material

Within this report, this information has been used as the reference point, baseline and justification for recommendations and the overall strategy for sustainable training.

4 Proposal for Comprehensive Supervision of Training

4.1 Ship Recycling Subcommittee on Training and permanent Ship Recycling Office for Training and Records

One of the most critical elements of achieving training sustainability in the Bangladeshi ship recycling zone is the establishment of management and administrative structures. This will ensure the proper management of administrative requirements and quality assurance processes demanded by any consistent training scheme².

For the purpose of this document, a basic framework made of two interconnected bodies is proposed for the supervision of training in the context of ship recycling: A coordination mechanism for strategic and governing functions and a permanent support body for the management of day-to-day operations.

Considering the number of workers to train (estimated to be between 25.000 - 40.000), two stable and permanent structures are considered necessary for training consistency:

- A supervisory mechanism or subcommittee developed under the Bangladesh Ship Recycling Board (BSRB) would oversee the overall training activities.
- The subcommittee would be complemented by a permanent and dedicated body/office in charge of day-to-day activities and administration.

As stated in the 2011 SBRR, training falls under the Bangladesh Ship Recycling Board (BSRB). Consequently, the board would ideally regulate, appoint and supervise a subcommittee and an administrative office in charge of training activities (Figure 1).

² As a case study, the training system developed in Bangladesh to oversee seafarers' STCW Training would be useful to investigate when developing an equivalent for ship recycling industry.



Figure 1: Management and Administration Hierarchy

Therefore, it is recommended that:

R1: A Ship Recycling Subcommittee on Training and a permanent Ship Recycling Office for Training and Records should be established. BSRB with BSBA support should regulate and control the activities of these bodies.

The main purposes of the Ship Recycling Subcommittee on Training and permanent Ship Recycling Office for Training and Records would be:

- To facilitate efficient and transparent decision making
- To cope with the difficulties in training tens of thousands of workers
- To allow access to yards only for trained work force
- To update, develop and assess training strategies
- To ensure adequate leadership on issues such as delivery, management and continuous improvement in the ship recycling training
- To support day-to-day training activities
- To monitor training efficiency and collect feedback
- To prepare regular activity reports and statistics to inform decision-makers and supervisory board
- To propose and conduct necessary evolutions

Composition of the Subcommittee should be determined by BSRB. It is suggested to include the following stakeholders:

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- Representative of the relevant National Agencies related to ship recycling and workers' safety
- Representatives of the BSBA
- Any relevant stakeholders such as workers' representatives and NGOs supporting Occupational Safety and Health

These representatives could be elected and have fixed terms of office.

Initially, having the inclusion of external experts, either from local or international institutions with a proven track record in delivering vocational education, would allow for guidance and expert advice in the transitional phase of the members of the committee gaining the appropriate competences and experience required to independently manage the administration of the training programme.

The envisaged tasks that the Ship Recycling Subcommittee on Training would be, at least, the following:

- Determination of training strategy and budget
- Supervision of training system including infrastructures
- Selection and approval of ship recycling trainers as well as Continued Professional Development (CPD) of trainers
- Internal auditing/review of training system and trainers' performance for consistency in delivery of training
- External auditing from National Agencies
- Reporting on training efficiency and needs to BSRB or/and Ministry of Industries
- Assessment of training and modifications

The permanent Ship Recycling Office on Training and Records would be an administrative entity implementing and supervising the training. The office would assume, at least, the following functions:

- Serve as dedicated contact point for ship recycling training activities and manage requests from workers, yards, National Agencies, BSBA, etc.
- Day-to-day management of training, trainers, and trainees
- Scheduling and organisation of training sessions and refresher courses
- Administrative support for trainers and trainees
- Control of training budgets
- Training curriculum and material update/modification approval
- Training dispute resolution
- Record-keeping of training activities and feedback
- Gatekeeper and storage of database of workers training records
- Issuance and management of training certifications
- Manage authorized workers' database
- Workers data verification and edition of ID
- Establishment of statistics for training and workers
- Any other prescribed task such as recording of near-misses, incidents, accidents, investigations support, etc.

4.2 Worker Registration & Training Records

The Bangladesh Labour Act 2006 requires employers to maintain records (service book) of their workers and to issue letter of Appointment and identity cards (ID-Cards) (Chapter II of Labour Act).

Effective and strict implementation of such requirements would avoid untrained, undocumented, unidentified workers as well as underage labour to penetrate and work in ship recycling facilities.

Moreover, the 2011 SBRR demands that only trained workers can be employed in ship recycling yards. So, issuance of ID cards for workers authorized to work in ship recycling yards would be conditioned by the completion of approved training.

Such activities (training and issuance of ID-Card) would be ideally conducted by the permanent Ship Recycling Office on Training and Records under BSRB Subcommittee on Training.

As documented in WP4, Part I of the SENSREC project, there are currently many proven and relatively inexpensive solutions for the effective record keeping, documentation and identification of workers at ship recycling gates.

The system recommended due to its functionality and simplicity was an ID-Card based system which is linked with a centralised database (hosted at permanent Ship Recycling Office for Training and Records).

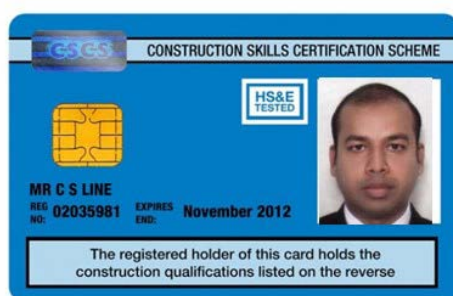


Figure 2: Example ID-Card

The ID-Card would be inclusive of the following information recorded, physically as text on the card as well as electronically, as a minimum (Figure 2):

- Identity of card holder (Name / Date of Birth / Place of Birth / Reference to National ID number)
- Registration number issued by centralized database
- Capacity and special functions (if any)
- Training: name of training / date and location of training / validity date (eventually)
- Identification of employer
- Working condition details
- Issuance and expiry date
- Photograph and signature of card holder
- Any other data such as contact person in case of accident, blood group, etc.

Within the scope of the ship recycling training, the chosen registration and record keeping solution should be universal through the ship recycling zone. Therefore, it is recommended that:

R2: The BSRB establishes an ID-Card based worker registration and record keeping database system for ship recycling workers

and

R3: The Ship Recycling Subcommittee on Training and the permanent Ship Recycling Office on Training and Records of the BSRB should be empowered and considered as responsible for worker registration and upkeep of training records

The opportunity of conducting a systematic registration of workers as they attend training should contribute significantly to resolving the undocumented nature of the ship recycling workforce. Furthermore, this will eventually allow the enforcement of the requirement that all ship recycling workers must be trained, and will ultimately solve the problem of underage workers.

4.3 Further Development of Training Materials

The created training materials and programmes will require periodical review (recommended every 2-3 years) by the Ship Recycling Subcommittee on Training to ensure they are fit for purpose and continuing to address the needs of the ship recycling zone. It is envisaged over time that updates and edits will be required. Therefore, it is recommended that:

R4: The Ship Recycling Subcommittee on Training periodically review training materials and implement a process for implementing upgrades/improvements/edits to the training programme

In addition, it is also identified that there will be a need to further develop/adjust the original SENSREC created training to incorporate refresher courses and courses to facilitate the upgrading of skills to support promotion e.g. a cutting helper becoming a cutter.

R5: The Ship Recycling Subcommittee on Training initiates the creation of refresher and skill upgrade courses based on the SENSREC training programme

5 Worker Engagement & Empowerment

5.1 Certification after completion of training

To empower the workers and show value in completing the ship recycling training programme, recognised certification of the skills they have learned is required. Certification of training can contribute substantially in contributing to the professionalization of the various roles of ship recycling workers. In addition to enhanced occupational safety and health, this can assist in addressing the high turnover of the workers.

Recognised certification is achieved through the accreditation of the training through the appropriate national body and this is further explained below.

5.2 Career Progression Through Training

To further encourage training engagement, promotions and career progression should be linked to successful completion of training. For example, for the progression of a cutters assistant becoming a senior cutter, there should be a clear path of what qualifications and training are required along with how much 'time on the job' is required to be served before a potential promotion is considered.

6 National Authority Recognition and Supervision

6.1 Training Programme Accreditation

The created ship recycling training programme requires BSRB supervision and eventually other National Agencies to participate in the accreditation and recognisance of the qualifications of ship recycling trainers and the training undertaken by the workers.

The accreditation process will be required to be initiated by the Ship Recycling Subcommittee on Training and require guidance from those familiar with the accreditation of vocational education in Bangladesh.

In the longer term the training should be mapped in accordance with the appropriate levels in the Bangladesh National Qualifications Framework. This will allow for the ship recycling training programme to be nationally recognisable qualifications and allow for workers to demonstrate validated skills if they wish to transfer employment to another sector.

6.2 External Auditing

As part of the accreditation of the training, the appropriate BSRB and other National Agencies should be conduct annual external audits of the trainers and the training facilities. The Ship Recycling Subcommittee and the permanent Ship Recycling Office on Training and Records could be utilised as contact points in undertaking these activities.

7 Training Infrastructure

7.1 Training Facility Requirements

In the Bangladeshi ship recycling industry, one of the issues of the most pressing concern is the physical location of where the training and associated administration will be centred.

From the findings of WP4, Part I of the SENSREC project it is evident that the present facilities, are insufficient and inadequate in quantity and quality to accommodate large number of trainees. Hosted inside the BSBA hospital, the BSBA institute remains of restricted capacity due to its size and lacks specialist training areas and equipment (e.g. to conduct firefighting techniques in enclosed spaces).

For a training facility to appropriately deliver practical and effective training demanded by the approved curriculum, it is important that it includes a number of fundamental training capacities that allows for skills development in a safe and controlled manner.

In Table 1, an outline of the required training areas, specifications and estimated capacity has been suggested for a typical ship recycling training facility. The training areas and their specifications are the minimum infrastructural requirements for a training facility to be deemed as having the capacity to offer ship recycling training.

Capacity estimates for each of the training areas is calculated in line with best practice for effective and safe training delivery. For example, the Bangladeshi Department for Shipping stipulate a maximum capacity for class based courses to be between 25-40 people. For safety critical training elements, such as confined space and fire safety training, best international practice recommends between 10 -12 people. Taking into consideration balancing the unique learning challenges of ship recycling workers and maximising the number of workers to be trained, the maximum training capacities recommended is 36 people for class based activities and 12 people for safety critical training elements.

Table 1: Training Facility Specifications

Training Area	Specifications	Estimated Capacity
Confined Space Training Area	<ul style="list-style-type: none"> • Tank with restricted access • Ventilation equipment • Rescue winch & harness • Gas and explosive Atmosphere meters • PPE 	1 training tank and trainer can support the training of up to 12 students at a time 1 Day
Fire Safety Training Area	<ul style="list-style-type: none"> • Safe and controlled zones for fire • Tank with restricted access • Firefighting equipment • PPE 	1 trainer can support the training of up to 12 students at a time 2 Days
Hot Work Training Area	<ul style="list-style-type: none"> • Oxy fuel cylinders and trolleys • Oxy fuel cutting equipment • PPE 	1 trainer can supervise up to 36 students at a time 4 Days
First Aid Training Area	<ul style="list-style-type: none"> • CPR dummy • First aid equipment • Recovery equipment (stretcher, ropes etc.) 	1 trainer can support the training of up to 12 students at a time 1 Day
Hazardous Materials Handling & Removal Training Area	<ul style="list-style-type: none"> • Asbestos removal equipment (negative pressure equip., enclosures etc.) • Oily water removal and separation • PPE 	1 trainer can support the training of up to 12 students at a time 1 Day
Working at Height Training Area	<ul style="list-style-type: none"> • Raised platform with secure attachment points • Harness and fall arrestor • PPE 	1 trainer can support the training of up to 12 students at a time 1 Day
Chemical/oil spill management Training Area	<ul style="list-style-type: none"> • Oil booms • Spill kits • PPE 	1 trainer can support the training of up to 12 students at a time 1 Day
General Workshop	<ul style="list-style-type: none"> • General tools • PPE 	1 trainer can supervise up to 36 students at a time 1 Day
Classrooms	<ul style="list-style-type: none"> • Large whiteboard • Projector • Computer • A1 Flipchart • Stationary • U shape desk configuration and chairs 	1 trainer can train a maximum of 36 students 3 Days
Other Spaces	<ul style="list-style-type: none"> • Equipment Store • Kitchen & Lunch Facilities • Toilet & Shower Facilities • Mosque • Offices • Graduation Space • Record Storage 	Variable Support Standard Training Period of 15 Days

Due to the scale and extent of infrastructure and equipment required to appropriately train workers, it is deduced that it will not be cost-effective or practical for every individual yard to invest in its own training facility. Instead, it is recommended that:

R6: A collective approach is needed in the form of establishing adequate bespoke ship recycling training facilities for the entire ship recycling zone. The Bangladesh Ship Recycling Board (BSRB) could coordinate and facilitate the development of such facilities in collaboration with BSBA.

7.2 Training Facility Capacity Estimate

Training facilities are required to be developed that address:

1. the specific training features mentioned in Table 1,
2. being conveniently located near the ship recycling zone and,
3. being of an appropriate size to address the large numbers of workers required to be trained.

As mentioned previously, anywhere in the region of 25,000 – 40,000+ workers are required by Bangladeshi law to undergo theoretical training in a training facility lasting a duration of 3 weeks/15 full days according to present requirements.

To give an indication of the scale of the challenge in developing the required training facility capacity, the following estimate has been calculated:

1. A practical realisation of the delivery of the content of the eight training modules (the approved 3 week/15 full working days theoretical training) in a training facility is initially drawn up (Figure 3).
 - A typical training facility is assumed which is of the specifications mentioned in Table 1.
 - The schedule is arranged to achieve optimal use of the training areas.
 - Each group of workers to be trained is defined as a **Training Cohort** of 36 trainees, which is the maximum number of recommended people to ensure efficient and effective delivery of training.
 - The Training Cohort is split into equal groups for training which is safety critical or restricted by physical limitations. These are defined as **Sub Teams** and in order to ensure efficient, effective and safe delivery of training should contain no more than 12 people.
2. The maximum training capacity for a single training facility is calculated to be a maximum of 108 trainees (3 Training Cohorts) at any one time (Figure 4).
 - Certain training areas will have a maximum capacity which place limitations on the number of trainees the facility is able to train at any one time. In Figure 4, it can be seen the Fire Safety Training is being utilised 100% of the time and is therefore the limiting factor in this example.
 - In order to accommodate 108 trainees and optimise the utilisation of the training facility, it has been calculated each new training cohorts must have a staggered start every 7 working days.
3. The number of trainers required to support the training activities of the 108 trainees (3 Training Cohorts) in the training facility is calculated to be a minimum of 6 at any one time (Figure 4).

4. Calculations are made to analyse, initially, the total training number of workers trained per year according to the example above, and then if the training schedule and facility was to be further replicated in greater numbers (Table 2).
 - Calculations are made on how many working weeks are in the year (minus 4 weeks for holidays and Ramadan period) and how many training sessions will be able to be conducted in this time according to the schedule in Figure 4. This number is then multiplied by the number of trainees trained per training cohort to achieve the total number of workers trained per year.
 - Extrapolation calculations are made to analyse the total training number of workers trained per year if the training facilities and number of trainers is increased. Finally, a calculation is made to estimate the number of years it would take to train the required number of workers (estimated to be between 25,000 - 40,000+).

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		Week 1					Week 2					Week 3					
Working Days:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Training Cohort 1	Sub Team 1A (12 People)	General Classroom (Modules 1, 2, 5 & 6)			Confined Space (Module 2)	HazMat Handling (Module 7)	First Aid Training (Module 8)	Chemical/oil spill (Module 3)	Fire Safety Training (Module 5)		Working at Height (Module 5)	General Workshop (Module 8)	Hot Work Training (Module 8)				
	Sub Team 1B (12 people)	General Classroom (Modules 1, 2, 5 & 6)			First Aid Training (Module 8)	Confined Space (Module 2)	Fire Safety Training (Module 5)		HazMat Handling (Module 7)	Working at Height (Module 5)	Chemical/oil spill (Module 3)		General Workshop (Module 8)	Hot Work Training (Module 8)			
	Sub Team 1C (12 people)	General Classroom (Modules 1, 2, 5 & 6)			Fire Safety Training (Module 5)		Confined Space (Module 2)	Working at Height (Module 5)	First Aid Training (Module 8)	Chemical/oil spill (Module 3)	HazMat Handling (Module 7)			General Workshop (Module 8)	Hot Work Training (Module 8)		

Figure 3: General Worker Training Schedule (1 Training Cohort of 36 Workers)

		Week 1					Week 2					Week 3					Week n					Week n					Week n									
Working Days:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29						
Training Cohort 1	Sub Team 1A (12 People)	General Classroom (Modules 1, 2 & 5)			Confined Space	Hazardous Materials Handling	First Aid Training	Chemical/oil spill	Fire Safety Training		Working at Height	General Workshop (Module 8)	Hot Work Training (Module 8)				Training Cohort n	General Classroom				Confined Space	Hazardous Materials Handling	First Aid Training	Chemical/oil spill	Fire Safety Training		Working at Height	General Workshop	Hot Work Training						
	Sub Team 1B (12 people)	General Classroom (Modules 1, 2 & 5)			First Aid Training	Confined Space	Fire Safety Training		Hazardous Materials Handling	Working at Height	Chemical/oil spill		General Workshop (Module 8)	Hot Work Training (Module 8)				Training Cohort n	General Classroom				First Aid Training	Confined Space	Fire Safety Training		Hazardous Materials Handling	Working at Height		Chemical/oil spill	General Workshop	Hot Work Training				
	Sub Team 1C (12 people)	General Classroom (Modules 1, 2 & 5)			Fire Safety Training		Confined Space	Working at Height	First Aid Training	Chemical/oil spill	Hazardous Materials Handling			General Workshop (Module 8)	Hot Work Training (Module 8)				Training Cohort n	General Classroom				Fire Safety Training		Confined Space	Working at Height	First Aid Training		Chemical/oil spill		Hazardous Materials Handling	General Workshop	Hot Work Training		
Training Cohort 2	General Classroom			Confined Space	Hazardous Materials Handling	First Aid Training	Chemical/oil spill	Fire Safety Training		Working at Height	General Workshop	Hot Work Training				Training Cohort n	General Classroom				Confined Space	Hazardous Materials Handling	First Aid Training	Confined Space	Fire Safety Training		General Workshop	Hot Work Training								
	General Classroom			First Aid Training	Confined Space	Fire Safety Training		Hazardous Materials Handling	Working at Height	Chemical/oil spill		General Workshop	Hot Work Training				Training Cohort n	General Classroom				First Aid Training	Confined Space	Fire Safety Training		General Workshop		Hot Work Training								
	General Classroom			Fire Safety Training		Confined Space	Working at Height	First Aid Training	Chemical/oil spill	Hazardous Materials Handling			General Workshop	Hot Work Training				Training Cohort n	General Classroom				Fire Safety Training		Confined Space			Working at Height	First Aid Training	Chemical/oil spill	Hazardous Materials Handling	General Workshop	Hot Work Training			
Training Cohort n	General Classroom			Confined Space	Hazardous Materials Handling	First Aid Training	Chemical/oil spill	Fire Safety Training		Working at Height	General Workshop			Hot Work Training					Training Cohort n	General Classroom				Working at Height	Chemical/oil spill		Fire Safety Training		Working at Height	Chemical/oil spill	General Workshop		Hot Work Training			
	General Classroom			First Aid Training	Confined Space	Fire Safety Training		Hazardous Materials Handling	Working at Height	Chemical/oil spill		General Workshop		Hot Work Training						Training Cohort n	General Classroom				Confined Space	Working at Height	First Aid Training	Chemical/oil spill	Hazardous Materials Handling	General Workshop			Hot Work Training			
	General Classroom			Fire Safety Training		Confined Space	Working at Height	First Aid Training	Chemical/oil spill	Hazardous Materials Handling			General Workshop	Hot Work Training				Training Cohort n			General Classroom				Fire Safety Training		Confined Space	Working at Height	First Aid Training			Chemical/oil spill	Hazardous Materials Handling	General Workshop	Hot Work Training	
Minimum Trainer Number:	1	1	1	3	3	3	4	4	4	6	4			5	6	6	6		6		4	5	6	6	6	6	6	4	5		6	6	6		6	6

Figure 4: Optimised Training Schedule (Maximum Of 3 Cohorts at One Time = 108 Workers Trained Simultaneously)

STRATEGY FOR SUSTAINABLE TRAINING FOR THE SHIP RECYCLING INDUSTRY

Table 2: Training Facility Capacity Estimates

Training Facilities*	Min. No. of Trainers	Working Weeks^	Training Cohorts per Year(1)	No. of Workers per Cohort	Trained per Year						
1	6	48	35	36	1260	Training Time Estimation	Time to Train...	25,000	Workers:	19.8	Years
2	12	48	70	36	2520			25,000		9.9	
3	18	48	105	36	3780			25,000		6.6	
4	24	48	140	36	5040			25,000		5.0	
5	30	48	175	36	6300			25,000		4.0	
6	36	48	210	36	7560			25,000		3.3	
7	42	48	245	36	8820			25,000		2.8	
8	48	48	280	36	10080			25,000		2.5	
9	54	48	315	36	11340			25,000		2.2	
10	60	48	350	36	12600			25,000		2.0	

*Presumed to have the facilities mentioned in Table 1 and have a maximum capacity of 108 students at any given time

^Working weeks minus national holidays and Ramadan period

(1) New training cohort starts every 7 working days

Please note the example above is for illustrative purposes only. Further optimisation and scheduling could result in further efficiencies, for example, if two fire safety training areas were present in a training facility this could increase the maximum capacity of a training facility.

7.3 Long Term Infrastructure Prospects

In the long term, it has been identified that dedicated training facilities are required for the Bangladeshi ship recycling industry to allow for the effective and safe delivery of training, secure the sustainability of the created SENSREC training materials and provide the foundation for future Bangladeshi ship recycling zone improvements. Therefore, one of the most urgent recommendations of this strategy is:

R7: An investigation into the optimal ship recycling training facilities size, location, design and funding/investor options should be initiated as soon as possible for the Bangladeshi ship recycling zone.

In terms of financing training facilities there are a number of alternatives that can be explored including the following:

1. A purely private collaborative enterprise through all yards contributing jointly in the initial investment and ongoing costs with a private organisation, such as the BSBA, responsible for the delivery, administration etc. - *potentially modelled on the Turkish Ship Recyclers Association's shared service approach*
2. A private/public partnership where the ship recyclers collectively negotiate through the BSBA with the Ministry of Industries and/or BSRB to agree on the sharing of initial investment contributions, operational costs and organisational arrangements
3. The appropriate Bangladeshi Government Ministries invest in the establishment of the facility and maintain sole responsibility for its operation. Fees are charged on an annual or per worker basis to the ship recycling yards

7.4 Short Term Infrastructure Prospects

In the interim period it will take to investigate, plan and build bespoke training facilities for the ship recycling zone, alternative solutions to comply with training requirements and meet the demand for safe and controlled training are required.

Within the findings of WP4, Part I of the SENSREC project it was highlighted that key institutions in Chittagong with a successful track record of delivering vocational training exist. Among the various institutions available to support large scale training, one institution is particularly well adapted. The Bangladesh Marine Academy (BMA), was highlighted as having the appropriate training knowledge and infrastructure to deliver ship recycling related training in the interim period. This is especially recommended in the training of trainers for the ship recycling zone. In this respect, BMA possesses staff, equipment and locations to perform demanding training such as confined space entry, firefighting, first aid etc.

Indeed, the ACS Consortium chose the BMA as the location of the training of trainers piloting activities and the positive feedback, from trainees and trainers alike, validated the BMA as a suitable training institute. Other local training institutions may also be considered.

R8: In the interim period, until dedicated training facilities are established, proven institutions such as the Bangladesh Marine Academy should be utilised to support ship recycling training.

Please see ANNEX for a cost proposal, based on actual costs from the piloting activities, for conducting a typical ship recycling training programme at the BMA.

7.5 Practical Infrastructure Realisation

Overall, the scale of the challenge in addressing the provision of training infrastructure to be able to train such a vast number of workers is evident from the estimates above. In the capacity estimations of Table 2, it is clearly seen that 10 training facilities are required to train the lowest estimate of workers in a period of around 2 years. This does not include the time it would take to physically build the training facilities.

In the current Bangladeshi context, the planning, funding and building of training facility may be challenging because of the difficulties in collecting sufficient resources and funds to support the infrastructural requirements required to deliver the appropriate level of training provision in an acceptable timeframe.

Therefore, within a practical context of what can be achieved, the following estimate is deemed to be a realistic overview of number of workers that could be trained:

- **Build a New Training Facility** – 1-2 training facilities or 1 larger training facility with specialist training capacity doubled e.g. 2x fire safety training areas, 2x confined space training areas, 2x working at height training areas etc., will be able to train:

1260-2520 workers per year

- **Utilisation of Existing Training Facilities** – According to the senior management of the BMA, there is currently enough spare capacity to accommodate up to 28 training cohorts of 36 trainees per year. This will train:

1008 workers per year

Cumulated total of 2268-3528 workers per year

According to projections in Table 2, this will require approximately 12-18 full time trainers. Using these estimates, it is expected that to train the lower total worker estimate of 25,000 it will take around 7-10 years.

8 Trainers

8.1 Establishing Pool of Ship Recycling Trainers

As clarified in SENSREC WP4 Part 1, the training is divided in two parts: classroom training and onsite/hands-on training. Classroom training requires dedicated trainers while onsite/hand-on training require qualified practitioners and experts.

Without a significant number of knowledgeable and experienced classroom trainers it will be impossible for the materials created within this project to achieve a sustainable impact. The main challenge envisaged in the Bangladeshi context is identifying suitably qualified trainers, in the required volume, who have the time and commitment to dedicate themselves to a full-time training cause.

To ensure the sustainable selection of the appropriate individuals, who can fully commit themselves full time to training, clarity must be given in the form of quickly deciding the overall training infrastructure approach and securing the appropriate funding mechanism to pay for trainers' wages etc. To this end, the ACS Consortium recommends:

R9: An investigation, by the appropriate authorities, to facilitate the establishment and funding of a dedicated pool of full time ship recycling trainers should be conducted

The benefits of creating a pool of trainers versus each individual yard having a trainer include: ability of government to administer the required systematic training, cost and efficiency savings, uniform training delivery standards, and easier administration, monitoring and updating of the training programme.

Concerning the second category of trainers, safety officers as defined in 2011 SBRR may be qualified appropriately (after approved courses) to conduct onsite/hands-on training.

R10: The Ship Recycling Subcommittee on Training should evaluate the training needs for safety officers to qualify them to conduct some onsite/hands-on training in yards.

8.2 Qualifications and Expertise

Selecting trainers with the appropriate qualifications and expertise is important to the overall quality and impact of the created training. The trainers' background experience, knowledge, skills, experience and dedication should be carefully considered before selection into the pool of trainers.

In the Bangladeshi ship recycling community, it is common to find talented and experienced people lacking formal validation of their skills through formal qualifications. This should be taken into consideration and not be an automatic barrier to becoming a trainer. It is expected the Ship Recycling Subcommittee on Training will have the overall determination on which individuals are suitably qualified and experienced to become trainers.

From the feedback from the training pilot of this project, it was shown that those from a wide range of backgrounds i.e. marine, health and safety inspection, ship recycling training, engineering were able to be successfully trained as trainers. Active or former safety officers in ship recycling yards should be encouraged to participate in basic and advanced training available in Bangladesh.

However, envisaged areas where they would need further support and training include:

- On the job/vocational assessment techniques
- Feedback provision
- Quality assurance/auditing
- General vocational education management/administration

Ultimately, the role of being a trainer does not just extend to simply teaching students. Requirements are placed on trainers to conduct administrative tasks which support the training.

Moreover, incentives must be developed to retain trained staff (trainers as well as workers).

In order to ensure the sustainability and continuous improvement of the training:

R11: The Ship Recycling Subcommittee on Training and the permanent Ship Recycling Office on Training and Records should provide ongoing support to ship recycling trainers

8.3 Increasing Number of Trainers

It is of great importance to increase the numbers of trainers in order to meet the demand of the vast number of ship recycling workers requiring to be trained. From the estimation above in Table 2, it can be seen a significant number of trainers could be required. From the piloting activities of this project, efforts have begun in the training of trainers. The next challenge is to further grow the numbers of trainers to create a pool of trainers of the appropriate size. It is envisaged that the training might initially be conducted at the BMA in the short to medium term and then subsequently at the bespoke training facility.

Moreover, the BMA can provide initial training and advanced training for safety officers selected by their respective yards to conduct onsite/hand-on training.

ANNEX – BMA Ship Recycling Training Programme Costs

As mentioned in this report, the Bangladesh Marine Academy (BMA) has been identified as an option for training ship recycling trainers and then possibly ship recycling workers. The BMA can hold up to 500 students but currently hosts only 100 full time cadets. Therefore, it has been estimated that the BMA can accommodate up to 28 training cohorts which means the BMA has the capacity to train up to 1008 workers per year (28 training cohorts containing 36 workers each). The following is an initial estimation, provided by the BMA, of the cost for a typical ship recycling training programme.

Assumptions:

- 1 Training Cohort (36 People)
- 3 weeks/15 days training course duration

Venue Hire Costs

The costs of venue hire include access to all required infrastructure (i.e. classrooms, specialist training areas), equipment, consumables etc.:

Venue Hire (one off payment per course)	Tk30,000.00
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Training Staff Costs

The training staff costs include:

Training Coordinator (Tk8,000 per day)	Tk120,000.00
3 X Ship Recycling Trainers (Tk6,000 per day)	Tk270,000.00
Support Staff (one off payment per course)	Tk30,000.00

Grand Total	Tk450,000.00
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Therefore, the training fee charged will be approximately **Tk2,000 (approx. \$160) per worker** for the whole course.

International Training Expert

In order to support the initial training sessions (and particularly train the trainer ones), it is recommended international consultants are present.

International Training Expert* (one off payment per course)	Tk1,000,000.00
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*Costs include accommodation, transport & subsistence costs in addition to a training fee for a week.

Additional Costs

Additional costs relating to transport, substance and accommodation will also have to be considered:

Food (per worker per day)	Tk800
Bus Transportation (per day)	Tk2500

As an alternative to travelling by bus every day (the BMA is an hour's drive from the city of Chittagong), workers can stay at the BMA's hostel, which can accommodate up to 300 people.

Hostel Accommodation (per worker per day)	Tk500
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