



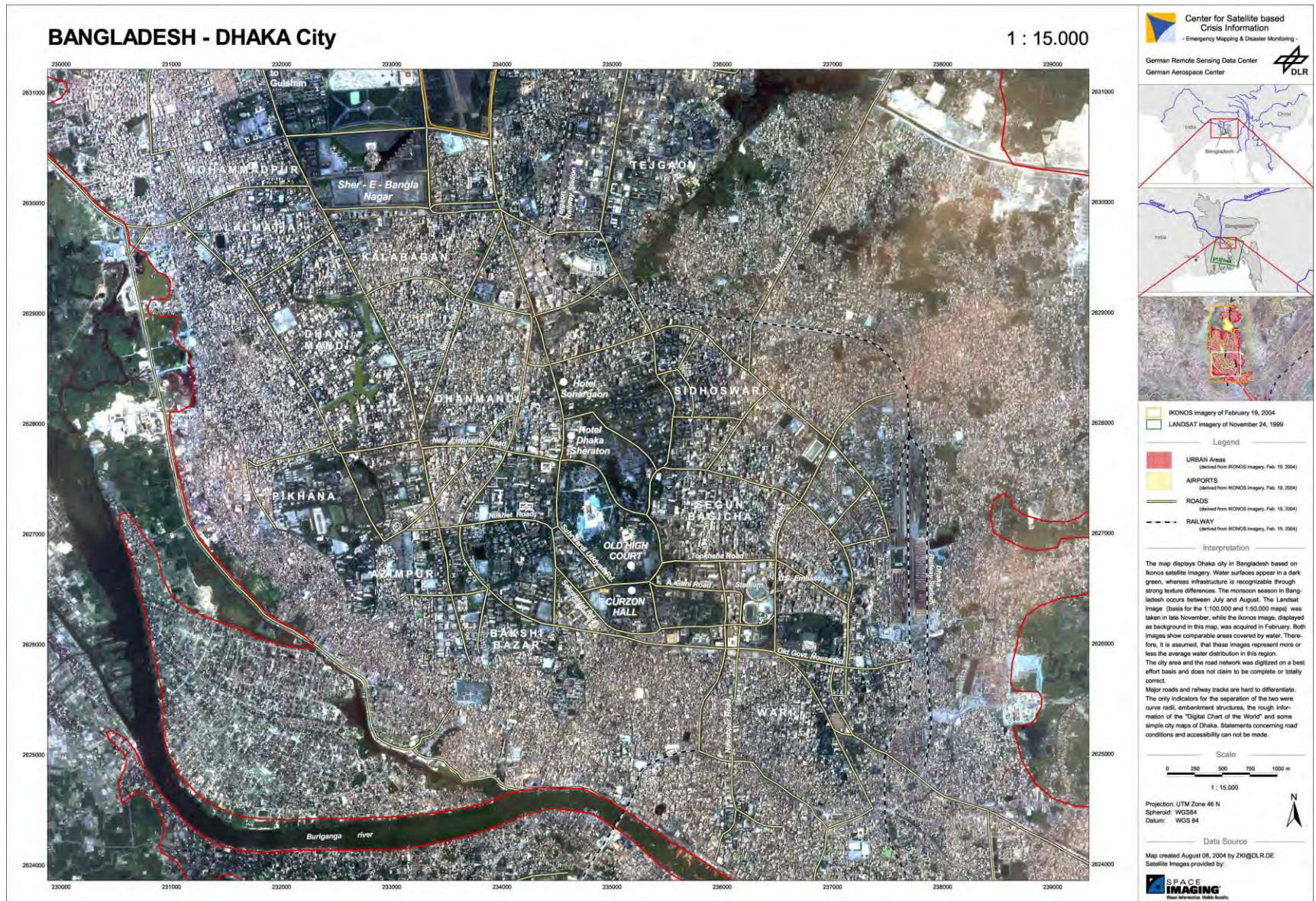
MEDECINS SANS FRONTIERES
DOCTORS WITHOUT BORDERS

Model Factory Project in Kamrangirchar, Dhaka Bangladesh

William S. Carter, Ph. D.
Industrial Hygienist

Slums of Dhaka, Bangladesh

Industrial Hygienist



•Background of KAM Urban Slum Project

- Since October 2013 MSF medical staff focused on 3 areas:
 - Reproductive Health
 - Intimate Partner and Sexual Violence
 - Occupational Health
- In 2014 MSF Conducted almost 4000 Consultations
- By 2015 recognized that over 50% of the patients had work related complaints associated with heat, noise or chemicals.

•Occupational Health Services

- Outpatient Consultation
- Laboratory Investigations
- Free Medicines
- Patient Referrals to other Health Care Facilities
- Regular Visits to Factories by Outreach Workers.
- Owners agreed to Register Factories with MSF

•2017 Hazard Survey

- Over 150 of the registered factories surveyed.
- Components of survey
 - a. General Physical Safety (10)
 - b. Controls Measure (5)
 - c. Use of Protective Equipment (6)
 - d. Ergonomics (5)
- Results
 - a. Inadequate lighting and exit marking
 - b. Few factories with soap, drinking water and rest area
 - c. Almost no provision of control measures
 - d. Very little PPE except in plastic factories
 - e. Failure to provide an ergonomically acceptable working environment.

•Project Background and Design

- As a result of the 2017 hazard survey conducted of about 150 small factories in the Dhaka slums of Hazirbagh and Kamrangirchar a Model Factory project was proposed.
- In early 2018 developed a project to identify factories that could serve as Model Factories
- Identified factories that employed between 20 and 50 workers that had been participants of the 2017 hazard survey to be involved with the project.

•Project Objectives

- Recognize that occupational health related diseases and musculoskeletal disorders are a neglected area of medical intervention in Bangladesh.
- Provide necessary support for Occupational Health and Safety in the industrial sector.
- Develop a Model Factory intervention program to improve the health and safety in the small factories of Kamrangirchar

•Project Actions

- Act as a model for change in working conditions in the factories in Kamrangirchar,
- Develop injury risk mitigation study where interventions designed on injury risk mitigation.
- Support MSF to learn and improve the implementation of workplace activities
- Interventions and safety standards in line with current Bangladesh rules and international practice.
- Assess MSD using the Extended Nordic Musculoskeletal Questionnaire (NMQ-E).

•Selection Criteria

- Willingness and consent of the factory owners.
- Poor performance in the 2017 Factory Hazard Assessment
- Number of workers.
- The size, layout and arrangement of the machinery and structures of the factory.
- Facilities available

• Project Phases

- Phase One – Conduct a hazard and qualitative risk assessment employing the OSHA Guidelines.
- Phase Two – Provide intervention activities to reduce the identified hazards and evaluate and/or adjust the interventions as necessary.
- Phase Three – Conduct the hazard and qualitative risk assessment to determine the improvement in health and safety of factories

• GARMENT FACTORY

Bobbin and Spool Thread Company

- Convert skeins of yarn into bobbins and spools of cotton thread.
- Priority activities:
 - a. Significant cotton dust is observed on machines walls, and floor. Conduct cleaning using a commercial wet/dry vacuum cleaner. Establish a regular cleaning and housekeeping to prevent dust accumulation.
 - b. There is inadequate ventilation to remove the dust, heat and humidity. Add circulation and exhaust ventilation.
 - c. Conduct Ergonomic Evaluation of Workers.

• GARMENT FACTORY

• Bobbin and Spool Thread Company

Using a wet/dry vacuum to remove cotton dust from machines, walls and floor.



- GARMENT FACTORY

- Bobbin and Spool Thread Company



• GARMENT FACTORY

• Bobbin and Spool Thread Company



- Conduct Ergonomic evaluation of workers
- Evaluate at least one person associated with each task.
 - Convert cotton thread into bobbins 48/day
 - Transfer thread from bobbins onto spools 5,600/day

Priority Activities

- Build a knee wall area for the storage of the screen print chemicals.
- Test lighting levels above the tailors to create an even lighting for better colour identification and work environment.
- Develop a LO/TO training program for those employees that may be in contact with electrical equipment.
- Evaluate Ergonomic conditions of tailors.

- GARMENT FACTORY

- Screen printing and tailoring



- Built a containment area to keep all screen print ink.



• GARMENT FACTORY

• Screen printing and tailoring

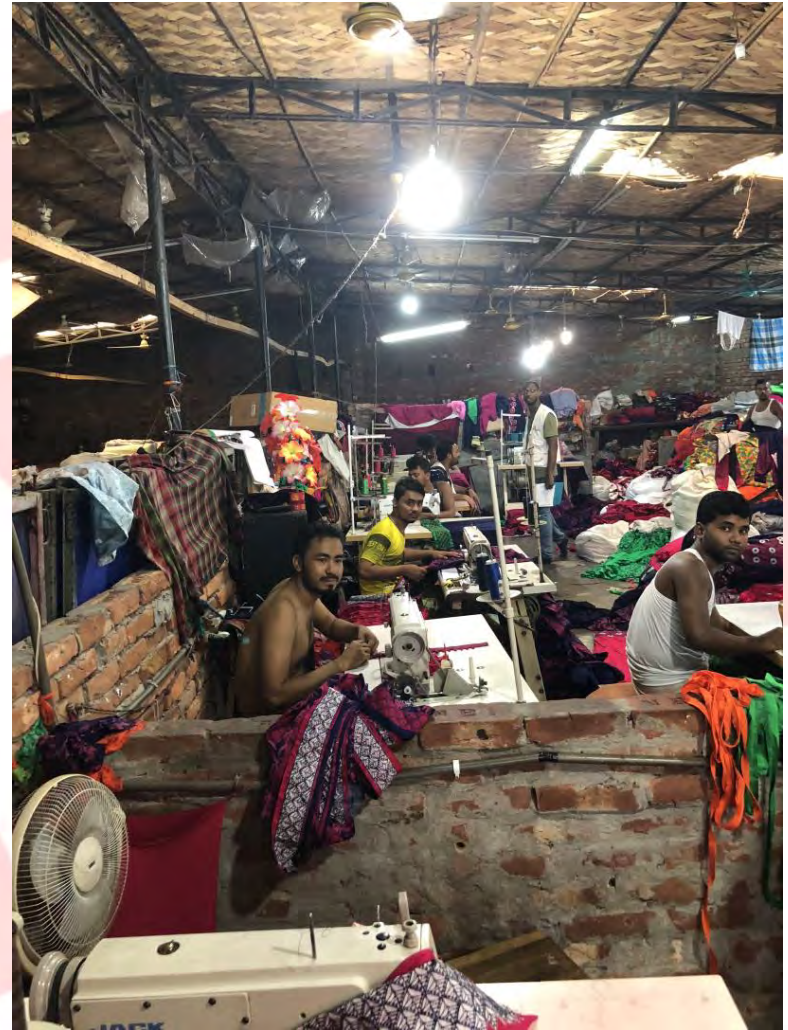


- Lighting survey shows light levels from almost 400 lux to less than 25 lux.
- Improve lighting by providing even lighting.
- Lighting design by professional lighting designer.

• GARMENT FACTORY

• Screen printing and tailoring

- Ergonomic evaluation done by interdisciplinary team involve OH Medical and IH teams.
- Conduct NMQ-E evaluation
- Take Videos.
- Perform RULA and REBA evaluation.



Priority Activities

- Install machine guards on the extruders and blow molders to protect against heat and grinder(s) to protect against moving parts.
- Conduct modelling to identify sources of noise and install noise controls since the noise is in excess of 95 dBA.
Provide ear muffs for use during operations
- Control polyethylene vapors by improve the LEV over the extruder as needed.

• PLASTIC FACTORY

• Blow molding of barrels

- First they grind the recycled plastic.
- Then put through Blow Molder



• PLASTIC FACTORY

• Blow molding of barrels



Priority Activities

- Organize the flow of material to provide better use of limited space. Get rid of unused equipment and safely stow spare parts.
- Install machine guards on the extruders and blow molders to protect against heat and grinder(s) to protect against moving parts.
- Conduct modelling to identify sources of noise and install noise controls since the noise is in excess of 100 dBA. Provide ear muffs for use during operations
- Control polyethylene vapors by installing LEV over the extruder.

- **PLASTIC FACTORY**

- **Blow molding of barrels**



Owner Improved the flow of material and better organized the space by installing a separate room for grinding.

- PLASTIC FACTORY

- Blow molding of barrels



Design Machine guards
for extruders.



- **PLASTIC FACTORY**

- **Blow molding of barrels**

Cover equipment with
acoustical blanket

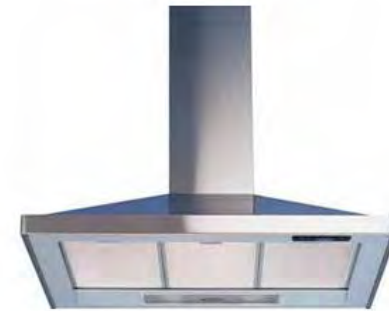
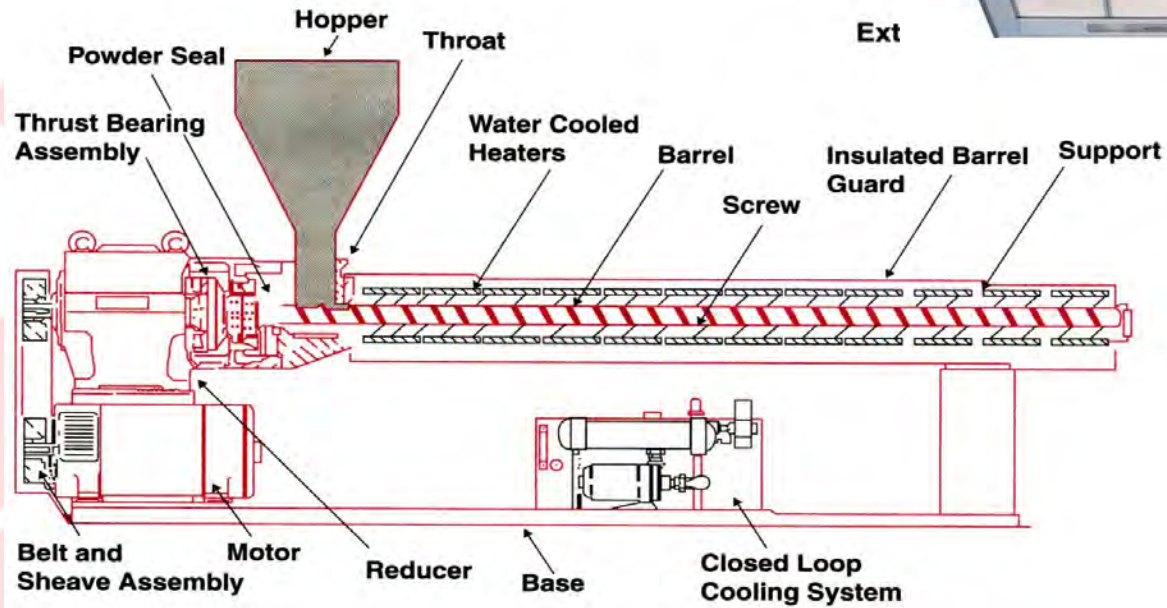


MEDECINS SANS FRONTIERES
DOCTORS WITHOUT BORDERS

- **PLASTIC FACTORY**

- **Blow molding of barrels**

Construct LEV for extruder



• RESULTS THUS FAR

Assessments and Interventions

- Have conducted 1st and 2nd Assessments on the four factories.
 - Thread Factory went from 39% non-compliance to 22%
 - Plastic Barrel Factory went from 40% to 26%
 - Garment and Screen Print went from 17% to 10%
- Have completed lighting measurements
- Have completed Ergonomic evaluations
- Completed design of LEV for emissions, acoustical control for noise, and machine guards.
- Delivered training for LO/TO, Haz Com, and Ergonomic issues.

• MOVING AHEAD

Complete Interventions

- Conduct a review of current interventions
- Complete lighting evaluations.
- Complete Ergonomic evaluations will recommend OH medical and IH interventions.
- Install machine guards.
- Install acoustical barriers for noise control.
- Install LEV for emissions.
- Conduct 3rd Hazard Assessment in January

• COSTS AND EFFORT

Interventions

- Ventilation Improvements -
 - General Ventilation 1070 Eu
 - Local Exhaust Ventilation - 450 Eu
- Noise Reduction
 - Acoustical Barriers – 1500 Eu
 - Acoustical Blankets – 74 Eu
- Machine Guarding – 415 Eu
- Dust Removal – 210 Eu
- General Safety (PPE) – 550 Eu
- Ergonomic and Lighting – 390 Eu



•CHALLENGES

Further Interventions

- Better engage owners in the interventions
 - Consider socioeconomic viewpoint
- Address child labour issues
 - Provide reading materials
- Develop a sustainable program
 - Involve other NGOs
- Determine whether this type of program is within the MSF overall mission

•THANK YOU!



- Mahmud Imran Talukder,
Environmental Health
Supervisor
- William Carter, Ph. D.
Industrial Hygienist

Dr. Rashed Md Mahfuzullah
Dr. Mitchell Sangma
Martins Dada
Dr. Grazia Caleo