Case Study: Former Caseros Prison – First Asbestos Removal Project In Argentina

Susana Mühlmann
Architect, Asbestos Removal Procedures and Legal Aspects Technical Advisor, Government of Buenos Aires, Argentina

Abstract and Introduction

In 1999, the Government of Buenos Aires City decided to decommission and demolish Caseros Prison, a 21 story-high concrete construction located in the City, inside a residential area with some small factories and only one block away from the National Paediatrics Hospital.

Empty since 2000, the building was programmed to be demolished one year later, however, it is still standing.

A division of the Army, a Battalion of Engineers with expertise on explosives, was commissioned to blow-up the jail in 2001, but just before the demolition attempt, asbestos was discovered in the cellars by Inspectors from the Ministry of Health together with a German expert and, because of that, the City authorities stopped the planned, massive implosion.

Subsequently, in accordance with the City Government's environmental policy, it was decided that, despite the lack of local standards, the asbestos would be removed using safe procedures.

It was necessary to: work on a basic legal framework and new documentation; explain again and again the basis of the asbestos procedures to all the people involved (from members of the Government to neighbours); give training to a branch of the Army specializing in biological, chemical, and nuclear emergencies; call on a diversity of specialists; estimate budgets on tasks never done before.

It took two more years and extensive teamwork among civilians and the military, public and private organisations, and local and international advisors, to bring this project to fruition.

The aim of this presentation is, then, to show how the Government of Buenos Aires City, together with all the institutions and individuals involved and with the invaluable assistance of international experts, adjusting step by step foreign standards to the Argentinean reality, was able to develop a large-scale asbestos removal project, fulfilling all required security measurements and procedures, and establishing the legal and technical background to develop local regulations.

Asbestos detection

- Asbestos was discovered in the prison on November 11, 2001, by officials and collaborators of the Ministry of Health, together with expert Dr. Bernd Wüstefeld, author of the German asbestos removal standards.
- Since that day, new fact-finding visits, countless meetings and consultations with specialists enabled elaboration of existing documentation leading to the first official installed asbestos removal project in Argentina.

Preliminary work

- Through an open call for bids at the beginning of the commission, the Aircon S.A. Company was hired in order to detect, qualify and quantify the asbestos contained in the building.
- On December 9, 2002, this company presented to the DGOP a technical report on the type, location, quantity and bulk sample laboratory results for the asbestos discovered, as well as a general plan for safe removal.
- The quantity of asbestos to be removed was estimated to be approximately 20 tons.
- The laboratory analyses showed that the asbestos type present was chrysotile.
- It was located in areas of the basement: the furnace room, kitchen-laundry and the hallway in-between.
- Having this information, it was possible to delineate, together with the Army, advisors of the DGOP and the Air Con company, a Plan for Removal, taking the three affected areas separately in order to adjust the procedure requirements to each one appropriately.

Since, in Argentina there were no local standards for safe procedures ensuring personal and environmental protection during installed asbestos removal work, the techniques adopted for the former Caseros Prison were based on standard procedures used in technologically developed countries like Germany and the USA.

At this point it is important to mention the freely-given and continuous advice, in person, as well as via telephone and online, received from experienced international experts on asbestos treatments. We want to express our deep thanks both for sharing their knowledge with us, and for their support and enthusiasm for this project. They are:

- **Dr. Christian Schepers**, Chemist and Engineer in Occupational and Environmental Hygiene, Safety and Emergencies from the University of Dortmund, in Germany.
- **Mrs. Karin Wüst,** Construction and Demolition Safety and Environmental Protection Inspector, from Berlin, Germany.
- **Engineer Andrew Oberta,** pioneer in the development of safe asbestos treatments and procedures, from Texas, USA.
- The **Deconta Company,** from Isselburg, Germany, dedicated to the design and production of comprehensive asbestos removal equipment, that sent a portable top-of-the-line air sampler to collaborate in the asbestos removal work at the prison.

The Plan for Removal included a wide variety of technical aspects and a budget affordable for the Government of Buenos Aires City, and as soon as it was ready, the following detailed procedures commenced.

Installed asbestos removal procedures

- The national and provincial regulations regarding installed asbestos removal procedures are new on an official level. In fact, the Caseros Prison project was the first significant governmental asbestos removal undertaking; the monumental scale of the project and the wide and complex scope of the experience gained set both legal and technical precedents for future asbestos abatement work in the City, as well as in the rest of the country.
- The procedures consist basically of preventing the removed asbestos fibers from affecting the workers involved and isolating the asbestos from the outside environment till its final disposal.
- These basic goals can be fulfilled by quarantining the affected areas, thus isolating the asbestos from the rest of the building and surroundings, and providing the workers with full personal protection.

Pre-occupational medical tests and training

- At this point it is important to emphasize that as part of the Safety and Protection Measures required for the asbestos removal procedures, it was mandatory for all the personnel to have had Medical Tests to verify their physical and psychological aptitude.
- Those tests were held by the Army and the results presented to the City Government.
- Training is also a mandatory requirement of the asbestos removal procedures. It includes instruction in the correct use of the personal protection equipment, the sequence of steps within the semi-permanent constructions and the removal itself.
- This Training was provided by the Army, with the technical advice of Air Con and supervision of the City Government.

Working area preparation

- **Encapsulant application:** When preparing an area for asbestos removal, the first task is to reduce the fibers in the air as much as possible. This can be done by applying a water based “removal encapsulant” that penetrates asbestos and “locks” fibers together; airborne fibers are thus aggregated and the aggregates congregate on surfaces such as floors, ceilings, walls, columns.
- In order to maintain the concentration of fibers in the air as low as possible throughout the removal process, the encapsulant application is continuous, both outside and inside of what will be the temporary or semi permanent constructions until the removal is completely finished.
- **Surfactant application:** Another water based solution containing a surfactant is used in order to make the asbestos wet, which is necessary for safe removal. This cannot be done with water alone: water permeates asbestos accumulations poorly without “wetting” the fibers.

- **Area clearing:** When asbestos is encapsulated and wet, all movable elements are stored together inside the working area in order to clear the sections where the semi permanent constructions will be built and the negative pressure equipment and sewage systems will be installed.
- These elements are also considered contaminated and will be disposed of at the end of the work in the same way that the removed asbestos will be.
- **Surface regularization**: Simultaneously, holes, ditches, chinks and irregularities of any type are covered in order to prevent accidents. There are three reasons to do this:
    - **Wet surfaces:** The permanent presence of water used to wet down the asbestos makes any surface extremely slippery.
    - **Low light:** As the electricity is cut, the light is generally too low or artificial, such as through directional reflectors.
    - **Reduced vision**: For prevention, personal protection is worn for all types of work, and the full face mask makes vision more difficult.

Semi permanent constructions

- After the tasks described above have been completed, the permanent constructions are built, in order to quarantine the affected areas.
- The materials for these constructions are: wooden strips, 200 micron polyethylene sheeting (generally triple), duct tape, nails, staples, wooden planks and sheet metal, among others.
- These constructions are fully hermetic and are permanently connected to negative pressure units equipped with HEPA filters, to assure air tightness and prevent fibers from getting out.
- Likewise, inside the protected area, a new partition of working areas is made, comprising, the Decontamination Units with a system of compartments and chambers for material and personnel.
- In the former, the only exit for debris, there is room enough for removed asbestos treatment as well as for clean and safe storage in 200 micron polyethylene double bags until departure to the landfill.
- The system of safety chambers for personnel, exclusive access to and from the Decon Units, is equipped with compartments such as dressing rooms and shower stalls, connected to a sewage system with filters to prevent fibers from entering the urban sewage.

Removed asbestos treatment

- Along with the general wooden strip structures, when asbestos is located at great heights, scaffolds are used. These have to be resistant enough to support a worker moving freely while removing the asbestos.
- After this, the asbestos removed from furnaces, boilers and pipes is mixed together with an inert binding agent, such as water, plaster and a little cement in a concrete mixing machine.
- The obtained moist mass is loaded into 200 micron thick polyethylene bags.

- The bags are twisted thoroughly, folding the neck and holding it with galvanized wire or plastic seals and duct tape as a final sealing.
- Then, each bag is encapsulated and introduced into another clean bag, which is also twisted and closed according to the same procedure, and finally labelled with an adhesive tag.
- In the same way, each element considered debris, such as polyethylene, wooden strips and planks, vacuum cleaner bags and filters, mask filters, wires, sheet metal, etc. receives the same treatment: encapsulant application and double twisted hermetic labelled bag, like the removed asbestos.

Air sampling: concentration of suspended asbestos fibers

- The environmental monitoring or air sampling is a very important part of the asbestos removal procedures. That is why by an open call for bids, as witness the official note Nº 713-DGOP-03, the Toxicology Research Centre (C.I.T.) was hired in order to do air sampling in the working areas and surroundings.
- The air samplings are performed every day. They start before building the semi permanent constructions and their results determine, firstly, the type of personal protection used, and finally, the moment when the asbestos removal is complete.
- For the first air samplings the equipment sent by the Deconta firm was used.
- Then, those monitoring cartridges were analyzed at the C.I.T.
- The rest of the air samplings were made by the C.I.T. with their own equipment.
- Regarding the determination of the airborne fiber concentration, the monitoring was based on the current local legislation, this is Resolution 577-MTSS-91, which regulates the procedures for air sampling in workplaces where asbestos fibers may be present.
- In the same way, Resolution 444-MTSS-91 was adopted, which indicates the Maximum Permissible Concentration (M.P.C.) of asbestos fibers in workplaces, for five days a week, working eight hours a day. In the case of chrysotile, which is the asbestos found in the jail, the M.P.C is 2 fibers per cc (this was changed after the jail removal to 0.1 fibers per cc).
- It is important to note that all the air samplings performed to date in the Decon Units and further compartments, have given results much lower that the M.P.C. requirements.
- Nevertheless, given that the personal protection is dictated by the monitoring results, even though the results were always low, the protection adopted since the beginning was total, meaning a one piece disposable suit with hood, gloves, rubber boots, and full face mask with two asbestos filters.
- In the same way, the eight hour working day was reduced to six hours, with breaks inside the Decontamination Units.

End of removal works and dismantling of the semi permanent constructions

- When air sampling shows that the affected areas are free of asbestos, dismantling of the semi permanent constructions is commenced.

- Likewise, those areas remain isolated from the rest of the affected areas to prevent new contamination.
- Simultaneously with the final asbestos removal work, mechanical demolition continued exterior to the affected areas.

Environmental monitoring

Environmental monitoring to check the concentration of airborne asbestos fibers has two objectives:

1) To control the environment the workers are exposed to.

2) To determine when a job is finished.

- These samples were taken every day, continuously and uninterruptedly till the last tool was removed and the final cleaning and encapsulation of the non-movable elements was finished.
- Then the results of the air monitoring showed that the asbestos removal was finished.

Removal, transportation and final disposal

- Simultaneously with the dismantling and last air samplings, the first containers full of asbestos in double labelled hermetic plastic bags set off to their final destination.
- Chemical Solutions Co. was responsible for this task and the CEAMSE, for the final disposal.
- When the trucks are loaded, the responsibility of the Army regarding the asbestos removal is finished. The transportation and the final disposition are responsibilities of the Government of the City.
- When the administrative details between the Army and the transportation company, Chemical Solutions, are finalized, the trucks, loaded with double 200 micron plastic hermetic labelled bags and covered with a canvas cover, set off in the direction of the landfill.
- At the end of the route, the dump truck arrives at the CEAMSE landfill located in González Catán, Buenos Aires Province.
- The dump truck goes to the landfill where the asbestos is unloaded and left ready to be buried.
- After unloading 21,820 tons of asbestos stabilized and encapsulated with plaster and cement contained in 200 microns double hermetic labelled plastic bags and receiving the CEAMSE Reception Certificate Nº 10-000215, the asbestos removal was formally finished.
- After the results of the last air monitoring on August 22, 2003, the affected area was declared “asbestos free”, and mechanical demolition started there at once.

Summary

Object: Mechanical demolition of two basements, ground floor and 1st floor at the Former Caseros Prison. Included: spilt Fuel Oil cleaning and **Installed Asbestos Removal.**
Contractor: Argentinean Army on agreement with the Government of Buenos Aires City.

Installed Asbestos Removal Project:

	US$
• **Asbestos Removal Works – Argentinean Army & Aircon**	88,100
• **Air Monitoring – Toxicological Research Centre**	10,873
• **Transportation – Chemical Solutions**	5,923
• **Final Disposal – CEAMSE**	1,091
Total:	**105,987**

Execution time: **(**from June 30 to August 22, 2003) **60 days**

Conclusions

- The detected asbestos was completely removed, always following safe procedures.
- Currently, representatives of the Ministries of Health, Labour and Defense, together with asbestos specialists and representatives from the private sector are part of a commission which is working on the installed asbestos removal Argentinean standards
- The Government of Buenos Aires City recently decided to form a commission with the initial aim of handling (detecting and treating) the asbestos in the city public buildings.

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