

INTRODUCING PAES MAMEDE, Lda



Paes Mamede is a Portuguese firm, with qualified know-how in gas installations' projects.

We have been working in the archives anoxic disinfestations area since 1997, projecting and assembling anoxic bubbles and chambers.

We also have commercial representations from complementary devices that meet our aim of providing human friendly technology to our Clients.

Our Clients are mainly Portuguese archives and libraries.

Improving and promoting PM's Anoxia disinfestations experience and technology in the European context are strategic management guidelines.

CONVERTING CHAMBERS: WHY?

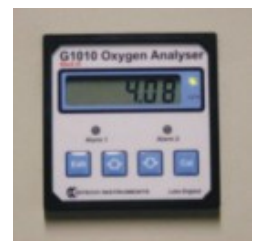
The importance of the subject: upgrading disinfestations chambers



- Ecology: side effects from the traditional gaseous pesticides on document's handling VS inert and non-toxic gas option;

- Economy: recycling old technology – keeping 60% of old components, consumption of easy acquisition gas, simple switching and controlling procedures – semi-automatized process;

•Effectiveness: achieving up to date anoxic chamber's patterns: the atmosphere inside the chamber is controlled, checked and registered. The treatment operation duration and results reaches original anoxia autoclaves performance.



CONVERTING CHAMBERS: HOW?

We have adapted chambers that used to work with ethylene oxide and methyl bromide.

The autoclaves were cleaned,

Old unnecessary accessories were removed,

The systems were checked,

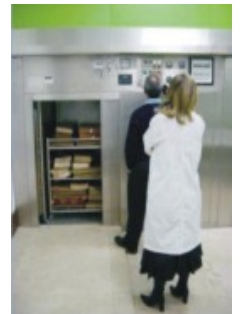
The chambers were upgraded and equipped for anoxia treatments.

CONVERTING CHAMBERS experience:



In this overview we propose to show the importance and practical advantages of the pesticide disinfestations autoclaves conversion as far as library and archives responsible are concerned.

We will present information upon the process of changes introduced into old technology chambers, its actual functioning, and, with the help of a graduated technician from Torre do Tombo, to **identify the converted equipment contribution inside the system of pests control and prevention in this Institution.**



Sequence of ACTIONS taken during the reconversion process:

1. The chambers were checked, in order to detect the presence of residues of toxic products, and then cleaned.



2. The system for closing and sealing the doors was checked and improved.
3. The prior systems of toxic products were dismantled and dispensed.
4. The vacuum systems were substituted, in order to achieve – 500 mbar.





5. It was designed a simple system to adequate the humidification of the gas.
6. It was designed and conceived a system to control the oxygen level inside the chamber.
7. The pressure and temperature control devices were checked and substituted, when any malfunction was detected.
8. Automatization of the whole control system.

TYPICAL TREATMENT STAGES:

The door is closed manually;

The automatic system is turned on, and begins with cycles of depression-pressure;

In a depression-pressure cycle the pressure goes down to -500 mbar, stays there for half an hour, then goes up to 300 mbar and stays there half an hour. These cycles repeat themselves until the oxygen level achieves 1000 ppm. When this value is achieved, the cycles stop automatically and the stationary stage begins;

The inert gas used is nitrogen; The relative humidity of the gas is checked and automatically adjusted to 45% -50%;

Usual permanence times of the documents inside the chamber (stationary stage) are 3 weeks;



EFFICIENCY Results:



The chambers have been successfully used for several years now and until now it hadn't been related any side effect on documentation or on objects treated.

Successful Case Study:

Portuguese National Archives- Torre do Tombo:



•A multiple purpose chamber, permitting the use of ethylene oxide, methyl bromide and inert gases, belonging to National Archives, in Lisbon, had never worked properly. The possibility of using toxic products had never been taken, due to similar side effects.

•The inert gases function option in the chamber wasn't credible since there were several systems missing, like the oxygen control, and the humidity compensation and control system.

•So, the chamber wasn't being used and at the same time National Archives were having infestation problems, **so the adaptation of the chamber was a priority.**

PART TWO

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PEST CONTROL IN THE NATIONAL ARCHIVES OF PORTUGAL: A CASE STUDY

1. Establishing a Preservation Policy for incoming Archives

In 1997 I started to work with the National Archives of Portugal as a Preservation Conservator Consultant. After one month of work I realise that the most urgent need of the Archives was implementing a Preservation Police for the permanent flow of incoming documents. In fact,



the Historic Archive that are going to be transfer in to the National Archives are usually in very bad conditions due to poor storage and lack of housekeeping routine in the record centre. The spaces chosen are economical renting areas such as cellars or basements that are hot in the summer, cold and very humid in the winter, with direct sun light, where dust accumulates and pests grow easily. That situation improves the development of all kind of pests.



At the time the only regular preventive procedure in the National Archives was routine use of pesticides. In fact, staffs were only alerted when epidemic levels of infestation were reached. Also the existent chamber never worked due to technical problems. So we installed a new department to treat the incoming material.



The service includes:



- A discharging-berth were trucks can arrive and unloaded the cargo;
- A reception area where packages are vacuum cleaned only in the exterior and are stored;
- A cleaning area were packages are open, unstable materials removed (e.g., metal clips, cords and so on) and document cleaned page by page;

- A quarantine area where we use insect trapping for pest monitoring and where documents are regularly checked before being sent to storage areas,
- A desinfestation area where documents with signs of infestation are sent to the anoxic chamber.

In conclusion all the incoming archives are now cleaned and when necessary disinfested before going into the storage areas. But soon we realise that this chamber is clearly insufficient for the load of incoming documents and the areas of infested documents already in the building.



2. Dealing with pest problems inside the Archives

2.1 – The reserve room experience



In the spring of 1997 we had an *anobiidae* infestation of serious proportions on the reserved room (area 500 m²). This occurrence obliged the Technical Services to think about immediate solutions for the problem.

Since the quantity of documents was also quite large and items very valuable, we decided to build an anoxic bubble that could contain 2000 documents.



Deep cleaning of each item followed this treatment. We can say that we had good results but also because we had the air conditioning system for that space internally redesigned by an external consultant, qualified in this matter. This allows us to keep a constant temperature of 16 to 17°C and a relative humidity of 45%. A consultant entomologist from the Science and Technologies University of Lisbon identified

the pest as *stegobium paniceum* and give these figures to us. His experience and investigation allow him to believe that even if after the anoxic treatment some eggs and larvae were likely to survive, with these climatic conditions during five to six years, there is a strong possibility of specimen's extermination.



In fact, in the reserve room no more insect activity was detected for the last four years.

In conclusion we can say that all this process was quite successful but the investment, especially in new equipments for air conditioning system, was very high.

2.2 The building and the storage areas



The previous experience could also be used in the storage areas of the National Archives. Nevertheless, in that zone things are much more complex and difficult to solve.

The reasons for that are:

1. The size of the areas (total dimension about 35.600 m²);
2. Variety of specimen identified;

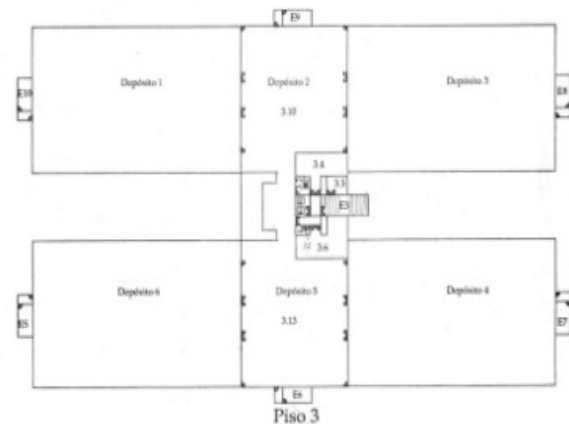
3. Conditions of the building and air-conditioning system installed.

In relation to the first point we can say that the storage areas are distribute in four floors having six areas each with the following dimensions:

- Larger rooms – 1.151 m² each
- Smaller rooms – 754 m² each

Regarding pests we have identified several specimen including:

- Outdoors – Pigeons
- Indoors – Anobiid beetle
- Silver fish
- Booklouse



The birds are installed in the small windows of the storage area walls that are very deep and ideal for the implantation of nest. The building architect must approve all alterations of the building so, after several conversations he allow us to use a physical barrier such as a point system. But birds were able to deal with it and after a while came back. So now we are changing it for a netting structure.

The insect's identification was done by locating in specific areas. We can say that pests are mainly coming from the documents that came from the old buildings into the new National Archive without any treatment. On the other hand, booklouse is likely to be an invader pest, coming from the pigeons nests because appears mainly along the wall that have more birds in the windows.



The building is only 12 years old, but structural problems have already begun to emerge. Large cracks in the walls, areas of infiltration, provide humidity inside the building and a fluctuating environment. Parameters of temperature and relative humidity are far away from being stable and sometimes R.H. raises above 65% and temperature above 24°C.

Achieving the appropriate environmental conditions seems a problematic task, even because we have got a large centralised HVAC system that needs remodel. Although the environment is a pré-requisit for successful pest management, the cost of maintenance and repairing problems in the building, plus cost of air-conditioning renovation is so high that it will have financial implications in other activities and projects of the Archives. So, this it is being questioned at a higher level.



3. Implementing an IPM Programme



In a large Institution like the National Archives the success of such programme is dependent of the co-operation between different services and the level of awareness about pests that exist in the Archive.

It is essential that staff from the maintenance and cleaning services, from the health and security offices, from the conservation department and from the archivist department, all have the same goal. Also, it is necessary to provide specific training for different levels of staff. This was our first step in our programme.

The second step was carrying out pest monitoring of the collections in the storage areas and improvement of housekeeping practices. Observation in a regular basis and trapping where our main tools for the first aim. The second leads to revision of cleaning routines especially in the storage areas. These two projects and systematic maintenance of the building are permitting us to gain time until we have the necessary funds to redesign the air-conditioning system and install bubbles, floor by floor, following the same method we did in the reserve room but at a larger scale.