erasmus HOGESCHOOL BRUSSEL | RITCS Royal Institute for Theatre, Cinema & Sound

kenniscentrum podium technieken

oistat THEATRE TIMELINE GROUP

Heritage, not only a sound mixing board

A swot analysis of theatre technical heritage

Chris Van Goethem

April 2017

Table of contents

Help, It's 3D

This article is not about history, but about the way we deal with our history and heritage. It is about museums, collections, libraries and forgotten storage spaces. It is about the enthusiasts that collect, the researchers and the practitioners.

Over the last three years, the Expertise Centre for Technical theatre of RITCS (Erasmus University College Brussels), together with SADA (University of the Arts Stockholm) has conducted research in the field of baroque theatre machinery. In the sideline of this research, we met all kinds of stakeholders, developed new research methods, and pinpointed a lot of issues and problems regarding the safeguarding of our heritage and history.

With this text, we want to give an overview of these discoveries, what problems need to be solved, what methods can be used, and how we can prepare for the future. But most of all, we want to open the discussion, trigger reaction, and inspire all stakeholders.

What is our history and heritage?

Looking at definitions of the concept "history" it strikes us that several definitions mention written sources as the only source for history. Most definitions talk about knowledge of events, some of them express the need for an understanding of change, a continuum. Some define past as " decisions completed, its participants dead and history told"

Heritage is defined as being transmitted, passed down from our predecessors, from one generation to another. Most definitions mention the immaterial nature of heritage. Industrial heritage refers to the physical remains of the history of technology and industry.

Applying these definitions to the history of technical theatre is not so easy and leaves out a lot of elements that seem to be valuable on first sight. Obsolete equipment and technology from the last fifty years would be excluded from history and all events that have not been put on paper would be disregarded. Heritage in general focuses on immaterial aspects and industrial heritage focuses more on the physical aspects. Technical theatre heritage has elements of both, but surpasses their boundaries. The history and heritage of technical theatre doesn't fit in the pre-defined boxes of historical science.

The history of technical theatre

The history of technical theatre spans over 2000 years, but yet the main developments are recent, since the last 200 years have brought more change and innovation than ever before. Our history is recent. The evolution in technology has been exponential, with a **steepening curve** after the second Industrial revolution. Most inventions can be placed in the 20th century.

Our field is **rapidly changing**. Equipment that was standard 20 years ago is not even recognised by today's student-technicians. We went from electrical equipment, over electronic and digital equipment to virtual systems in a time span of less than 50 years.

The field of technical theatre spans **a wide range of fields**: machinery, set building, lighting, sound, image, stage management and special effects are the most obvious. But technical theatre also relates to other fields: industrial heritage, architectural history, military history (lots of inventions are reused), computer history, the history of

innovation, of how technology travels and spreads, of manufacturers, brands, etc. It includes (performing) art history, sociology and history of labour organisation.

The history of Technical theatre is **more than theatre alone**. It includes the history of Rock & Roll, of festivals, rental, dance halls, events, etc. The development of technology they have in common and the cross fertilization between these sub-fields are important elements that deserve attention.

Typically, the history of technical theatre covers **Europe and the US**. But what about the African continent, with the interesting confrontation between "native" and "colonial" influences? Or the Asian theatre with its different traditions and corresponding technologies?

To use a Dutch expression, the history of technical theatre "**falls in-between quay and ship**" it is not art, it is not technology and therefore it is disregarded by both. The fact that technicians are supposed to be invisible when doing their job doesn't help either. If technology is mentioned in history books, it is mainly in the side-line of production, "two spotlights in the back of a picture of the actors". But who made these actors visible?

History is **not a list of facts and dates**, it is about people, relations, stories, coincidences, working together,… meeting people. We use the dates and facts only as a laundry line to hang stories on that influence people.

The result of the theatre technology is a **performance**. We can't archive this result. You can't grab a performance, it is a unique moment in time. It only exists in the heads of those who were there. We can only archive what exists in the side of a performance: the reviews, the text, the stage managers' books, the technology, the working methods, the visions, the stories, etc. These elements enable us to reconstruct the experience as close to the original as possible .

Our history is locked up in other "containers" of our common memory. Technical documents, drawings, models, equipment, and stories are the core information to write our theatre technical history with. This heritage is essential to write our history. But what is our heritage? And how can we maintain it?

Technical theatre heritage.

Technical theatre is located on the intersection of performing arts, technology and crafts. Although invisible, it is of great influence on the performance practice. After all, technical theatre determines the "mise en scene" and the scenography.

The **material, immovable heritage** consists of the equipment and installations that are fixed in buildings or need to be kept in buildings to retain their value and meaning. One example of this is stage machinery. If it is removed from a building, it is a quantity of steel or wood, without a meaning. The meaning is related to the stage and the auditorium it serves in.

The **material movable heritage** consists of objects, equipment, and text material like stage managers' scripts, performance documentation, schemes, plans, manuals, bids, … We shouldn't forget that the technology is mainly interesting because of the relation with the performance. In other words, how the technology influences the performance and how it takes part in the performance.

In this context, the preservation of **living histor**y, the testimonies of professionals, is very important. Without insights into the working methods, the technology remains abstract, dead matter.

This brings us to the **immaterial, intangible heritage**: the traditions and working methods that draw an image of the operator as an executing artist. These traditions and methods can be checked against the material heritage. But they also contain important information about the relation between artists and technicians.

History is written by the safeguarded

It is a typical saying that "History is written by the victors", I am not sure this is true in our case. The past is gone, and what is left is history, is an expression that is not necessary true either. History is, per definition, subjective, what is left is what is documented, or even better, what has been safeguarded. And even what has been safeguarded is biased. We can't expect that the written sources we base our history on to be **unbiased**. The producer of the writings has a goal and a vision that influences what is written and what is not. The producer writes for an audience that is alive at that moment in time.

A theatre magazine for example decides what productions it will write about. It will do so based on what the editor feels is "good quality art". This means popular productions or less "arty" productions will be disregarded, depending the target audience of the magazine. A scenographer writing a book about design will probably mention the technology, but will be less interested in the technical details or the problems that can occur. As there is little written from the point of view of the technician, it can be hard to get a good insight in the reality of the time.

The fantastic collection of engravings printed between 1738 and 1768 of the sets of the Amsterdam Schouwburg or city theatre, which opened in 1665 and burned down tragically in 1772, were never meant to represent an exact image of the sets. Instead they were meant as memories, either to be used on their own or bound alongside a buyer's chosen play or script. They show a highlight of the performance, often combining different scenes or actors.

Undeliberately, the writers will also decide what is left for the future. Things that are not written about, documented or safeguarded will disappear in the mists of time. This influences the image people will have of us in 200 years!

Why keep theatre technical heritage?

The short answer to why we would need to keep our history and heritage is to allow us to better understand the past, contextualise the now and support the future.

Understanding the past

So why is technical theatre history so important? It is not the technology that is so fascinating, but the influence it has on performance. To understand past performances and design, we need to understand the technical means and methods that were used, we need to understand the vision of the technicians, and we need to debunk the myths.

The evolution of occupations and skills, the understanding of performance and scenography, the knowledge about the equipment and methods are the basic material for research, the building blocks of an evidence- supported history.

If we want to understand how a performance was staged in the castle theatre of Drottningholm, we need to be able to fact check the possible positions of the actors against the technical means. Will they stand in the light? Will they get hurt? Will we understand them? All these questions can be answered with a profound understanding of the technology.

If we want to understand the colour use of sets painted around 1900, we will need to know the colour temperature of the light, the position of the equipment and the lighting methods of that time. All this information is hidden in the understanding of technology and traditions.

Identity

One of the big questions a human being can ask himself is "where do I come from?" We build our identity on what our predecessors were and did. But even without the big philosophical questions our heritage defines who we are. We do a lot of things in our daily life because the people before us did it the same way, so the transition from one generation

to another defines who we are. History becomes fascinating when you start to see the link with your life, your work, and your interests.

Supporting the future

A last aspect is innovation. If we want to innovate our current practice, we need to understand our past. Understanding the past technologies inspires the search for possibilities in the future. Most contemporary principles are derived from the technological basics set a long time ago.

New ideas are always based on understanding the past. Reviewing, analysing, and a critical creative eye brings new insights and new ideas. Or as a practitioner once said: "Of course we make the same mistakes, but we make them better!"

Where is our heritage?

To find out where our heritage, as keeper and source of our history, is kept, we have to dig into the diverse types of collectors and collections. There are as much different collectors as there are collections. Their reasons for collecting are equally diverse. But based on the reasons behind their collections, we can try to catalogue them, as if they were heritage themselves.

- First of all, there are the **compulsive collectors**, people that never throw anything away and have cellars and attics full of "stuff" The essence of the collection is "keeping" or "having".
- A second group are the **romantic collectors**, they are mostly interested in the shape, for aesthetic or nostalgic reasons.
- Next we have the **collector-users**; technicians that want to keep the equipment in a working state, because they are interested in the way it functions, want to record or hear recordings on vintage sound equipment or because they rent out equipment such as old lighting equipment as props.
- A special type are the **collector-tweakers**. They want to use the equipment in a new way, even if the conversion means destroying the original. Tweaked equipment is often used in performance.
- More and more we see also that equipment is "raised" to the level of **industrial design**. Spotlights are gilded, put on a "land surveyor stand" and sold as "vintage industrial" design.
- **Collector-Researchers** search and keep equipment to be able to research the technology or use. The main reason is because they need the equipment for a longer time, because it is not available in collections or because collection materials are not supposed to be used.

A wide range of professional organisations, museums, libraries, collections and archives also keep part of our heritage, mostly in the sidelines of their collections. The objects have been given to them for all kinds of different reasons:

- They have a **general technical collection** like MIAT in Ghent,
- They keep the **city archives**, like the archive in Kortrijk or the Felix Archive in Antwerp,
- They are focussed on **theatre heritage**, but not the technical side like V&A Londen, Theatermuseums in Vienna, Helsinki or Malmö.
- They collect a **specific type of material** like the historic trade catalogues of the Museum of Old Techniques in Grimbergen.
- They have a collection for **pedagogical reasons** in their function as cultural centre or theatre company, like LaMonaie, Arenberg theatre, or the Leipzig Opera. Most of these collections are driven by the enthusiastic individuals working there.
- They got it as part of the **acquisition of a larger collection** they were interested in like the university of Amsterdam, taking over the collection of the Dutch Theatre Institute.

This makes that a lot of the information is dispersed over technical, architectural or art collections, city, theatre, literature, historic, or even police archives. (Some cities had a separate police department for theatre). Almost none of them have a focus on the field itself.

Manufacturers, sales companies, and rental companies also own heritage equipment. Sometimes for romantic reasons, or as part of their company identity or archive (Sennheiser collection, Philips archive, Siemens archive, …). In some cases they also use the old equipment for commercial reasons, to rent out (like Kick Artistical & Productional Solutions), or as part of their marketing strategy. Companies like DANOR or Gerriets, have a collection that goes beyond the direct focus of their activities.

Heritage is sometimes kept in forgotten storage spaces. It is kept, because there was no reason or motivation to throw it away, without being aware of its existence. Typical examples are rolled sets, stored high in a stage house, sometimes hanging there for fifty years or more.

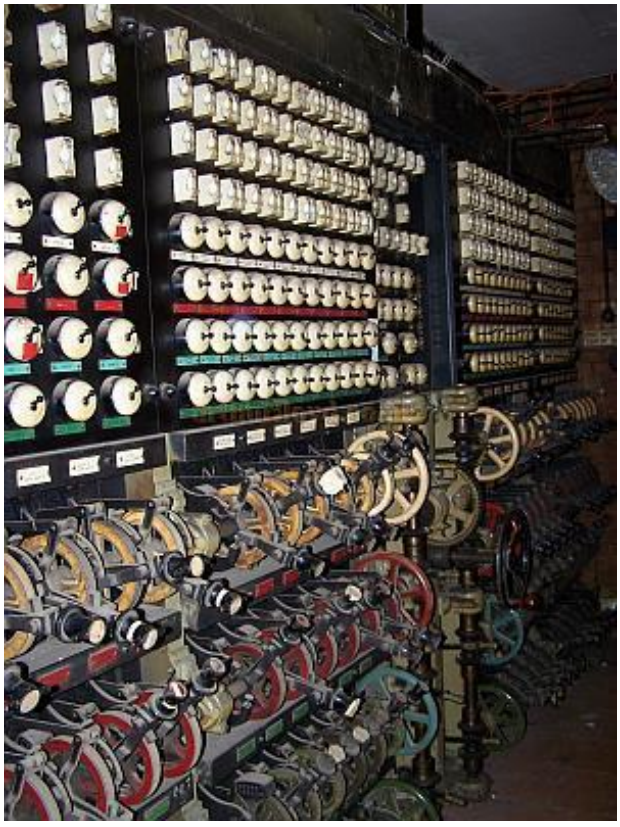
Anyway, most of the physical heritage is not accessible for the public, as it is locked away in the storage facilities of collectors and organisations. On the other hand, more and more information is becoming available online.

Museums like Architecture Museum Berlin, V&A London or Technical museum Stockholm have extended virtual collections, researchers are publishing their research online, professional organisations put their magazines archives on the internet, Perspectiv creates a world covering database of historic theatres and theatre crafts collects information in the Backstage heritage collection, private initiatives focus on specific equipment, like the ADB archive or the Telescan virtual museum, specialist sites focus on deeply specialist information, the Museum Of Obsolete Media tells and gathers everything on audio and image formats, the hifi engine collects (service) manuals of vintage equipment,… The list is endless.

So if you are looking for your heritage, it is probably somewhere out there, hidden in the darkness of a storage space or in the blinding overwhelming mass of information of the Internet. The challenge is to find it.

Problems and solutions

Based on the experiences and discussions of the last years, we started to see a pattern in the problems and issues concerning the safeguarding of our heritage. The list below gives, without being exhaustive, an idea of the risks to our heritage as it is collected, used and stored right now.



At risk

In the last decennium a lot of new initiatives have been developed to safeguard our theatre-technical history. Most of them work on little islands, based on individual initiatives. But these **collectors** are getting older, the cost of storage and safeguarding is high, and there is little support. When the moving spirit, the driving force disappears, the initiative dies with him (or her), and so is the collection.

Museums have to develop **policies** for their collection, they have to focus on one subject and have to “let go” of side fields. This means trying to find another museum with the right focus or in the worst case, destroying the objects. Theatre technology lies somewhere between industrial-technical and artistic-cultural heritage, this concept doesn't fit in any of these strict collection policies. As hardly any museum has this double focus and no museum has a focus on theatre technology, there is a high risk that valuable objects will disappear forever.

Museums have to be run as **commercial** organisations, creating "return on investment", cutting costs and increasing efficiency. Theatre technical collections have a

limited audience, need a lot of highly specialised and diverse care, and take up a lot of expensive space. From a management (in the commercial sense) point of view, these collections are not a priority, or even worse, they are a priority when it comes to getting rid of things.

Theatre technicians are talkers, not writers. The intangible heritage, transmitted from generation to generation, is enclosed in the heads of those who participated in the incredible evolution of the last fifty years. But unfortunately, these practitioners die, and their story is gone, forever. Our **oral history** needs to be recorded urgently.

In general we can say that a lot of collections and heritage are at risk and there is a realistic possibility that a serious part of our heritage will get lost if we don't act.

A lack of awareness

The owners of our heritage are often communities, cities, theatre companies or sector related commercial companies. Most of these organisations are completely unaware of the (historic) value of what lays in their cellars and attics.

When a new generation of technicians lines up, replacing a generation that was brought up with all this "old junk", they will probably have no idea of what this "old junk" was used for, or even realize that it was ever used to make a performance. The next spring-cleaning will probably be the moment to make space, which means equipment, carefully cherished for years, disappears to the junkyard for ever.

A lack of knowhow

Museums often don't have the knowhow to deal with technical theatre objects. Not only does the care for technical theatre objects ask for very specialised and divers competences and knowledge, a specialist also needs a profound insight in theatre practice history. On the other hand, museums do have the expertise skills to safeguard, catalogue, and manage the logistics of a collection. As important cultural players, they also guarantee a long-term future for objects that are in the collection.

Collectors generally have the expertise concerning the field and the technical skills to maintain and restore equipment. But they do not always have the skills and the knowledge to deal with heritage objects regarding a long time future. It seems obvious that collectors and museums are born to be each other's partner. But for all kinds of reasons, this does not seem to work.

Selecting without guidelines

It may sound horrible to our ears, but collecting is selecting. It is impossible to keep everything, and so a selection has to be made of what is kept and what is "removed" from a collection. The big question is what to keep and why to keep it. The reasoning behind this (partly) depends on the focus and the function of the collection. A research collection will probably keep other or more things than a collection that is meant for a large, general audience. At the moment,

there are no guidelines for theatre technical heritage, so we have to rely on more general guidelines that do not always fit this type of objects.

Objects that represent a turning point in history and that embody a phenomenon are typically kept because the object stands for a larger group of objects or for a change in history.

The general guidelines of the Flemish community also state that top class heritage objects should be rare and indispensable. Rare means there are little equal or similar objects or collections in the same condition. In other words, the objects are hard to find in this condition. Indispensable means objects are needed to reconstruct, tell, present the history of the field. An object can be indispensable because:

- It has a particular value for the collective memory
- It has a pivotal function, representing "a missing link"
- It is a benchmark
- It has a particular artistic value.

Applying these parameters to technical theatre heritage is not that easy. It is an emerging field, and little research has been conducted, so we don't know yet what the missing links or benchmarks are. But there is more. We cannot see most of these objects as separate elements, they are part of a tool that enables us to make sound, light, motion, image, … A single spotlight only tells something about the technology. To understand the effect on stage we need the combination of dimmers, control boards, cables, stands, and accessories. But does this mean we have to keep a full set of the same spotlights to be able to reconstruct the effect of the lighting?

Objects from the more recent history are mostly mass produced. A question here is if the object is a reference to the generic object or is it a unique piece. In reality it is a combination of both, it represents the generic object, but is unique because it has been used in a specific theatre, a specific play, for a specific designer.

The need for expertise can be illustrated with a small example: I revisited a small theatre museum, as they had one of the last surviving ADB Masterlights. This light board fits all the above criteria, it has coil memories, was the first memory board of its kind, … At first the desk officer denied the existence of the light board, but after a long time and a few phone calls to different people, I finally got the manager to explain to me they didn't really know what it was. It was big, it was in the way and they had decided to get rid of it.

If we want to be able to make proper selections in the future, we will need to think about common, supported guidelines for our heritage. And we need to build a network of expertise to support the selection.

Cataloguing without guidelines

An important part of a well-maintained collection is a decent description and cataloguing system. Collectors have no insight in the methodology behind a system like this and no comprehensible guidelines seem to be available, nor is there a good tagging system or a common taxonomy to reference the theatre technical objects. If we assume that a theatre technical collection is almost per definition international, a common, multilingual tagging taxonomy is essential to find back objects in collections that are spread over the world.

Integrating a specific technical theatre taxonomy in the "tagging dictionary" museums use, would also solve the problem of not being able to find back objects, that do not seem directly related to our field, but add valuable information to it. Think of pictures with equipment in the background, bids and administrative documents, etc.

A last point of concern is the relation between the generic type of a mass produced item and the unique object itself. This needs a two-step cataloguing system that is able to combine information on both levels.

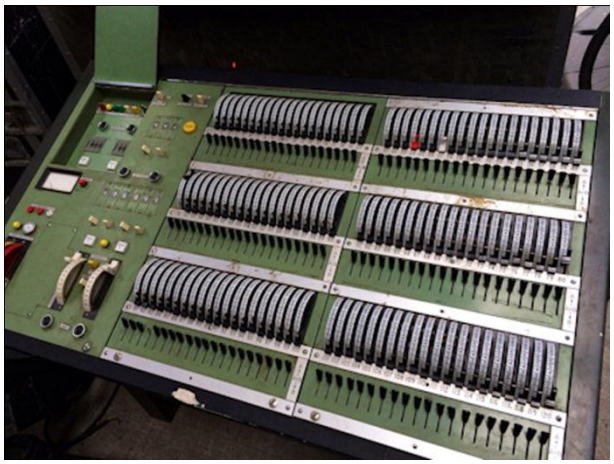
Dating equipment

Establishing a relation between an object and a date or time span isn't easy either. In most cases there are no paper traces left of a specific object. It probably has passed several owners before it came into a collection. The generic type has been produced over a long time span and it has been used over an even longer time span. Publicity and documentation are often not dated. Variations and updates occur within the same generic type.

The information we have is mostly indirect. Publication dates of books, magazine advertisements, etc. can give an indication of a starting date. End dates of production are even harder to find.

Safeguarding, renovating, restoring of physical objects

Once an object is in the collection, the next step is deciding what condition we want to keep it in. Some objects have been stored in less favorable conditions, have been altered, used for spare parts or are not even recognisable. So choices have to made about the work that needs to be done to make the object useful for the collection.



In the first place the object needs to be kept from further destruction or degradation, ensuring that the original materials are kept as much as possible, rusting and corrosion is stopped, fragile elements are supported, and so on. Once the object is "stable", we can decide on the next steps.

One possibility is **renovation**, the object is brought back in the condition in which it left the factory or that of when it was bought. This can include repainting, rewiring, replacing missing pieces, etc. Renovation will remove all traces of use, and therefore of the history of the object.

Another option is **restauration**, the object is brought back to a specific moment of its life span. This will probably be a moment when it was in use, but in good functioning order. Traces of use are left, but it is "repaired", ideally with the methods used at that time. It is cleaned, probably rewired if needed, components are replaced, and missing pieces are added.

An important element in the choices that are made is safety. If we want to keep objects, we need to be sure there is no danger, such as for example of asbestos inhalation. If we want to use an object, it should be safe. If we put it on exhibition, it cannot not endanger the audience.

All these treatments need expertise, insight in the use, insight in the technology, understanding of restauration and safeguarding techniques. This expertise is partly available in the heads of a slowly disappearing group of practitioners, and partly available from museum specialists.

How do we deal with electrical and electronic equipment?

Most equipment has been standing unused for a long time, as spare, or just because there was no reason to remove it, before it ended up in a collection. This causes issues for electrical equipment. The wiring can be affected by mice, degradation of plastics, or can even be pulverized. Specific custom-made plugs are lost. Components like condensers, coils, etc. are degraded or dried out. Isolation has been reduced. Standards for wireless frequencies, electric mains or safety have changed. Consumables are not or limited available, lightbulbs, lime cylinders, audio or video media are hard to find.

Solutions for this can be found in other fields, that is why the exchange of knowledge and good practice can improve the quality of conservation and the potential use of the equipment.

How do we deal with digital equipment?

Digital light boards, sound consoles, effect machines, or automated fly bar controllers are in fact computers. In most cases the BIOS, the part of software needed for the first part of the start-up of the computer, is adapted to improve functionality, reliability and speed. This BIOS needs a battery to maintain its memory. If the battery is gone, we are left with an nice, but empty box. The BIOS is the soul, without BIOS the computer is lifeless, or "undead" if you prefer.

There is very little information on how to overcome these problems, on how to keep, safeguard and restore the software. In fact we would need a library of software versions and previous BIOS'. But most companies do not seem very eager to give this information, probably because it is part of their trade secrets.

But even information on how to maintain a standard computer is hard to find. The few museums that are dealing with this rely on retired former specialists, which doesn't guarantee a long-term solution. So how to ensure we can repair, reinstall software, … in the future? It is an open question, not to mention the issues of different software and hardware versions that are not compatible, the loss of media, etc.

How do we deal with (digital) media heritage?

We still can read a text that is written 2000 years ago, we still can look at the drawings of da Vinci or Sabbattini, but if you want to hear an audio cassette, recorded in the eighties, you need specialised help and have to search for equipment. Digital formats are even posing bigger issues, lost codex, software that doesn't run on modern computers, etc. There is even a museum of obsolete media http://www.obsoletemedia.org/ collecting information about lost media types. A specific problem for our sector are sound fragments used in performance, the content can be put on another medium, but the cue's will be lost.

We can read letters written in 1600, but do you still have one Email from 5 years ago? We can look at the stage managers' book from 1700 in Drottningholm, but can we still read the (digital) stage managers' book of a production that played 5 years ago? We do not have proper procedures, methods, or attitudes to deal with this.

The problem gets even worse when working with specialised visualisation software, CAD or CNC software, MIDI sequencers, video control software, databases, etc. Without the original software, we collect only bits and bytes. While we can recover drawings, sketches, audio, or video from obsolete analogue carriers, it is hardly possible to recover digital information without the right software or even the right version.

Packed, the Centre of Expertise in Digital Heritage,(http://www.packed.be/) started as a platform organisation for the archiving and preservation of audio-visual arts and is now a centre of expertise for digital cultural heritage. They look into issues of creation, cataloguing, storage, distribution and exchange processes for digital heritage sources, as well as on the archiving and preservation of audio-visual arts. But it would need an international effort to dig into the digital heritage problems of the technical theatre history.

Next to what we produce digitally, we also digitalise objects, information, images, etc. but we don't know if we will be able to read them in the future. We lack a long-term vision on the future.

How do we deal with virtual heritage?

Virtual information, in human language "all information that is on the internet", becomes an increasingly important source of information, and a way to collect, and to share things. Since the last decade, an increasing part of this information exists only virtual. This information is the future virtual heritage.

But websites disappear. One click of a provider or the IT manager destroys information worth hundreds of hours of work, often collected by a community of volunteers or enthusiasts. A merge of universities, a new IT policy, a change of owner, a missed payment, low traffic, a forgotten password, or the end of a project can have an irreversible effect.

Old fashioned Html pages can be grabbed. You can make a pdf, for example, but the pdf loses its links and part of the information is in this functionality. The situation with dynamic websites is even worse. Dynamic sites do not really "exist", they are created, assembled the moment you look at them and they disappear the moment you stop looking at them. They are a snapshot in time.

Internet Archive (https://archive.org) is a non-profit library of millions of free books, movies, software, music, websites, and more. Tools like their Wayback Machine try to safeguard websites, by taking regular snapshots, but the results are partial and have limited functionality. For example, when you try to see the Danor Lighting Museum site, that has disappeared, you only see some pictures and empty pages.

To be clear, this is not a plea to stay analogue, but a cry to think about our virtual heritage. There is a serious risk that we will be suffering of "Digital amnesia" in the future, or as a colleague put it: "If we go on like this, we will know more about the Romans that about productions played ten years ago."

Conflict with making theatre

The historic value of specific types of equipment and objects partly depends on the relation with the (theatre)space where they are placed or can be used. Keeping these objects in those places often conflicts with the contemporary use of the theatre. On the one hand, the equipment becomes an obstacle in the space limiting its functionality, on the other hand the use of the space limits the visibility (and visitability) for an interested audience.

Theatre makers love heritage, but they want to work with it, alter it, travel around with it. The artistic process does not leave time or attention to work with fragile materials. "Art before all" is the motto. The risk of damage or even destruction is not unrealistic in such an environment..

Documents

One of the tasks of a (paper) collection is to "weed" the documents. This is a way to reduce the required storage space for documents by removing unnecessary documents, doubles, etc. Most collections have a policy on what needs to be removed. But in some cases these general policies, destroy important information of our field, mostly because of a lack of understanding. Some examples:

- The Kortrijk museum has the financial information, including the bids, for the theatre built in 1912. If this information had been treated according to the modern policies, it would have been thrown away, as financial information isn't kept. And even if it was kept, the doubles would probably have been thrown out. The are two bids, that seem identical on first sight, but in reality the second bid is an adaptation, due to a request to lower the budget. The comparison of both gives valuable information on what priorities were made regarding equipment, especially because the arguments for the reductions are added.
- The Smithsonian weeding policy proposes to remove supply and vendor catalogues, a valuable source of documentation of technical equipment. It also proposes to only keep final versions (and no drafts), while in our field these would demonstrate the process that is essential to understanding theatre.

- The guidelines for cultural institutes in Flanders state that recordings should be kept, unless when they are only short fragments, in which case they can be destroyed. Even if the authorities probably didn't mean to destroy original production tapes, the tapes perfectly fit the description.
- A theatre library threw out the light plots and stage plans tucked in the back of the directors' and stage managers' copies of the play text. The cues and annotations in the text have become completely useless without this additional information.

Documents are not necessarily important pieces on their own, but they are indispensable for the safeguarding, understanding and using of objects. An adapted policy is needed to avoid losing the information we need. Plans, sketches, technical documentation, maintenance manuals, and commercial documentation are crucial to keep and document equipment. Technical riders, stage managers' books, including plans, lists, and plots, contain valuable information about performance.

Storage and logistics

Dimmers, speakers, elevators, drums, and other technical theatre artefacts are not the smallest or easiest objects to keep. Transport, manipulation and storage is expensive and labour intensive. These objects are heavy, and large, but on the other hand they are also fragile. A dimmer rack or a light board can weigh over a hundred kilos, but has a lot of fragile connectors or sliders that make it difficult to manipulate.

Not only do we need enough storage space, but adjacent workshops must be large enough for restauration or preparation. An extreme example of this problem are rolled backdrops. They can be up to twelve meters long, but on the other hand have only a diameter of 20 cm. But if you want to look at them, you need a space that is at least eight meter high or a floor of ten by fourteen meter.

Oral history

People die, and with them a bit of history dies too. Much of the information about working methods, traditions, and social relations, so-called "small history", has never been put on paper. Bringing history to an audience requires stories that can attract, that make the invisible visible. We need to safeguard what is in the heads of experienced practitioners. We lack good practices on interviewing and documenting, and proper ways to store and unlock this information.

In the sideline of this lost oral history, in most cases their personal archives disappear as well. Some organisations are starting to make agreements with their members, before the last curtain falls, but regardless a lot of work still needs to be done here.

Legal obstacles

Copyright and ownership issues are the main obstacle for safeguarding and showcasing a collection. But there are other legal issues that can get in the way as well, some examples:

- Contractors that are forced by their contract to destroy the equipment that is in a building they demolish. Because of this, valuable pieces end up at a scrap yard.
- Governmental services and communities that are not allowed to give anything away except after a long and complex administrative procedure. If they take something out of their inventory, it needs to be destroyed.
- The ban on incandescent light sources that makes it impossible to find replacement bulbs.
- Changing frequency bands make it illegal to own historic wireless equipment

- Archiving guidelines which disregard technical documentation, including cue lists, bids, inventories, technical riders, etc.
- …

Research in theatre technical history

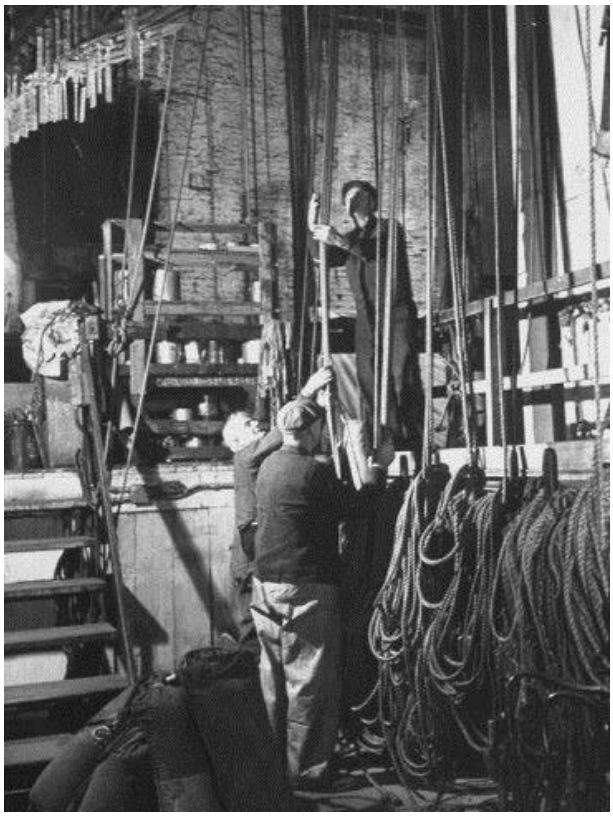
To do research means having the time and the means to find out what you always wanted to know. This may be a bit simplistic definition, but it has some elements of truth in it. First of all it shows that in order to conduct research there has to be a need for answers, and there has to be a drive from the researcher to go after the answers. The definition also tells something about the time investment required to get results.

The research in the field of technical theatre is situated somewhere between academic research and practice based research. The limited availability of reliable sources and the type of questions that must be answered make that a mix of different research techniques and methodologies are combined.

Written sources

The available written sources are mainly written for another purpose or audience. The information is often from the point of view of the author, who is rarely a technician. Technicians' views have hardly survived and almost never in traditional sources. The lack of technical insight often leads to misunderstanding and myths. As sources often copy from each other, a multiplier effect occurs.

The existing descriptions focus on the result and not the methods, the functioning, or the construction, and are often subjective, trying to make an artistic point rather than a technical valid description. Even dictionaries on theatre often have drawings or plans that do not reflect the reality. Some of these plans cannot possibly be realised, since they give insight in the result, but are not a reflection of the exact technical functionality. Of course there are exceptions such as the work of Sabbattini, which is almost a manual for theatre construction, explaining in detail how and why things are build.



Research by doing

Research in theatre technical history is often done by "research by doing". The descriptions and other sources available are put to the test. A method is tried out, built, and confronted with the reality of gravity and friction. This way we can verify if it works, if it could have worked with the means of that time, what the advantages and disadvantages are, and how it fits and influences the performance.

This methodology is not unique to our field, and is useful for a lot of technical history fields. Popular TV programs like "Myth busters" and "Building Leonardo's machines" are well-known versions of this method. But also the building of a medieval castle with the original tools and methods in Guédelon, France is a good example of research by doing.

Research by doing offers different views and insights on the matter. By doing, you discover the problems, you think in a different way. Based on the information gathered during the doing-process, theories can be proved, sources can be evaluated, history can be described. Wouldn't it be fantastic to build the theatre described by Sabbattini, just following his guidelines? Or to stage the dialogues of Leoni di Somi on lighting and staging and see which new insights we would get?

Interdisciplinary research

The field of technical theatre does not stand on its own, it is imbedded in other fields like theatre, event and music history, and social, industrial and architectural history. It is about art and about technology. It is about theory and practice, about the physical and the invisible. To develop this research, we need academics, practitioners, artists and technicians from different fields (light, sound,…). We can include experts from companies, developers of visualisation software, rigging calculators, … We can get expertise from fields with comparable problems. Wooden machinery resembles windmill technology, lighting boards are computers, military explosive experts can help with special effects. We can even use methodologies from completely different fields. Terminology management from the linguistic field can be used to map historic language use and to track migration in technology.

Usable research

The result of research should be usable, it should flow back to the sector and the larger audience. It should be inspirational for practitioners. Therefore, the results are not necessary academic texts, but popularised articles in professional magazines, videos, simulations, manuals for construction, and models that can be used, tested, and experimented with. The result should finally get back into performance, to serve the audience.

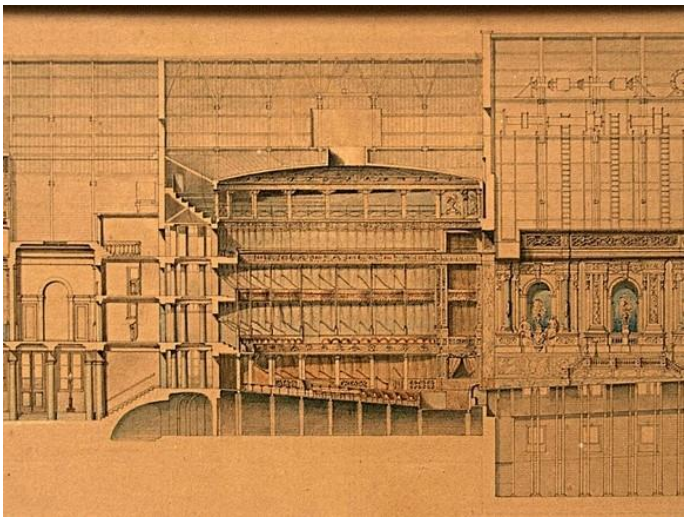
Models, visuals and replicas

We have always used scale models and visual representations in theatre practice. We use them for different purposes: to develop ideas, to test possibilities, to show what we want to say, to discuss what we want to do,…. Models help us to better understand a complex 3D environment or an intangible situation. Stage actions in 3 directions, lighting, and changing sightlines are just a typical example of when a model becomes useful. The scale model is cheaper to build, gives a better overview of the stage as a whole, is easier to adapt, and gives insight in the final result.

Models in our sector are used to discuss stage settings, lighting, mechanics, etc. In other fields, like education, they are also used to show the working of steam engines, mechanical principles, optics, etc. A short list of examples shows the diversity and the different purposes of these models.

Drawings as models

The simplest way of representing reality is a drawing. Drawings are also the oldest form of visual information that has survived history. Drawings are easier to preserve than models are, they take up less space and are less fragile.



As simple as Leonardo da Vinci's drawings in the Codex Madrid of a theatre in the round may be, they provoke an image of reality. You can see the theatre as it would be built. The theatre, "that consisted of two semi-circular amphitheatres which rotated around a pivot and then closed to form a complete circle", is the practical elaboration of a description in a text from ancient Rome. In one glance, we understand the whole idea.

The drawings and sketches of Nicola Sabbattini in "Pratica di fabricar scene e macchine ne' teatri" are completely different, but serve the same purpose. Simple line drawings, with characters referencing to the text, give a three dimensional insight of what Sabbattini wants to explain. One could send these drawings to a workshop and they would be made as Sabbattini imagined them.

Both types of drawings have one thing in common: they could have been made today on a beer mat in a discussion between designers and technicians to clarify what they want to say. So they are working tools rather than illustrations. This makes these drawings more than a sketch. They fulfil the same purpose as a model.

The lighting model of Furttenbach

The oldest mentioning of a lighting model is in a text of Joseph Furttenbach, in the 17th century. He mentions that he experimented in a small theatre with a miniature stage that he erected in his workshop. There is no factual information left, but one can imagine him working in a replica stage with candles, small boze etc.

The mechanical alphabet

Christopher Polhem, a Swedish industrialist and inventor developed the "Laboratorium Mechanicum" or "the mechanical alphabet" in 1697 which is kept in the The National Museum of Science and Technology in Stockholm. It is a collection of small models showing different mechanical principles and transmission systems meant for engineering education.

Boat model of the Afrikanskan

The production of the Afrikanskan production in the Stockholm Opera in 1867 includes a set representing a ship on a rough see. The ship spans almost the entire with of the stage and moves up and down. The movements are controlled by the "captain" sitting in the house, and turning a ship's wheel.

The preparation of the construction included a scale model, showing the movement and staging opportunities. The model survived and can be seen in the Stockholm Opera archives. It gives a great insight in the machinery, but also in the way professionals looked at their work at that time.

Dresden lighting and set model

One of the nicest theatre models I have ever seen was a small, I guess 1:25, model in the office of a professor of the Hochschule für Bildende Künste Dresden during an OISTAT meeting a long time ago. The model was equipped with spotlights, furniture, and sets that were so accurate you couldn't see the difference with full scale.

Goudi, model of forces

One of the best examples of how one can visualise the invisible is the Antoni Gaudi's model for the church of the Colònia Güell. It is not a representation of the church itself, but a 1:10 scale model of the forces that would develop in the complex construction. The structure hangs upside down, modelling the working forces, represented with hanging weights.

Replicas of lighting technology

Understanding light quality, especially if the light is produced by sources that are no longer in use, is a difficult thing to do. The viewer has no reference framework and light quality is almost impossible to register on another medium without interpretation. Even more difficult is that the light quality partly only exist in comparison with other sources.

Per Simon Edström built a set of replicas of candle, gas, lime and carbon filament light sources. The replica is made to be used in (small) performance situations and to be able to change from one source to another. In this way the effect of the source can be experienced and the differences can be seen.

the LaMonaie model

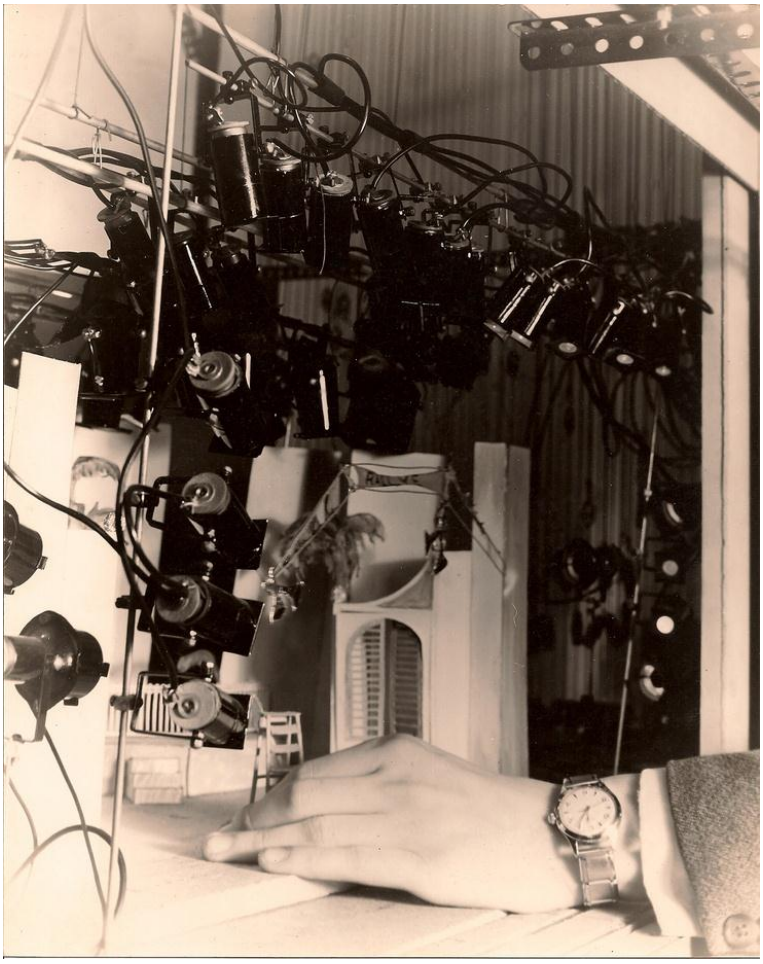
The central piece in the museum of the LaMonaie opera contains a 1:10 model with working stage machinery. The model built by Michel Dumont , Thierry Bosquet and Max Laroche is a representation of the stage opening of the Markgräfliches Opernhaus Bayreuth. The machinery is not the one from Bayreuth, but represents the typical machinery used till the 19th century.

The sets and the impressive cloud "Deus ex Machina", painted by Thierry Bosquet, respresent a typical set for a "changement a vue" in the 17th and 18th century. The changeover is performed before the museum audience, accompanied by a typical opera fragment. The model gives a great view of how the changeovers, the "changement a vue" would have looked like, in relation to the music.

Faszination Der Bühne model.

This scale ½ baroque stage was built from 1993 on by high school students under leadership of school director Klaus-Dieter Reus during a sixteen year taking school project on theatre history.

In 1989, during the remembrance activities of the 250th anniversary of the Markgräflichen Opernhaus Bayreuth it was presented to the Bayreuth audience and has been touring since. It is now part of the collection of the Initiative Theater Museum Berlin.



The model is a real museum quality piece that gives an insight in the changement a vue technology to a large audience. The viewer can change the scenery, and the borders and legs, with the aid of reconstructed historical stage machinery. The model includes a sea wave machine and a cloud machine. On this scale the combination of a set that is changing in front of the audience and a working machinery that is visible and operable by the audience is unique.

Steve Kemp theatre

The Steve Kemp theatre is a scale 1:4 lighting theatre. Originally built in the Beo premises, it moved to ILO (the Institute Lighting Design, Amsterdam) where it is used intensively. It is seen as the "mother of lighting models" in Europe. The model is equipped with scale versions of all types of contemporary lighting equipment, and has a floor of 2.40 m x 2.4 m and an adaptable grid height of 1.6 m.

The model is used to prepare productions, conduct research and for education. It helps to get (and show) insight in lighting set ups and to experiment with alternatives. It is a tool for communication as well as research and offers possibilities to revive historical lighting set-ups very close to reality.

Maeckelbergh model

In 2014, Jerome Maeckelbergh built a model of the under machinery of the Antwerp Bourla Theatre for the "Wood and Canvas (and rabbit glue)" congress in Antwerp. The purpose was to show the possibilities of this historic machinery, with its stage wagons, elevators, cassettes and raked stage for contemporary use. The model, on a scale 1:10 is a working replica.

Using the model as base, new ideas were developed for modern use. Moving turntables, sliding platforms, a ballet of risers and similar movements were tested. One of the most important findings were the endless possibilities for synchronising the movements and using elements to counterweight each other.

The model gives a fantastic overview of the complexity and the possibilities of a full size theatre with wooden machinery at the top of its development.

One to four machinery model

The one to four model, built by the Expertise Centre for Technical Theatre (RITCS, Brussels) is not replica of a theatre, but a simulation of the different technologies and methods used in theatres with wooden machinery. It is a scale theatre house built with adapted HOAC riser systems that gives the possibility to experiment with different types of equipment and machinery.

The scale 1:4 has several advantages for research. It is rather easy to adapt, change, and modify equipment or to move it to other positions. It is big enough to move between the machines and to change the rigging. But more importantly, the scale provides enough friction, inertia, and realistic weights to "feel" the reality, to experience the forces, to see if something can really work.

On the other hand a scale one to four still gives the viewers the possibility to see the machinery as a whole, and understand the functioning. This overcomes the problem encountered in full-scale theatres, where one never sees the whole of the machinery.

Virtual models

Virtual models are more and more used for research. A good example of this practice is the research of Timothy De Paepe. He reconstructs theatres (and other buildings) based on text sources, maps and plans. The models are used to check with other sources and with physical reality. In most cases there is not enough information to make a detailed drawing of these long gone buildings, but the added assumptions can be checked with the sources for their possibility and likelihood. The advantage of virtual models is that it is easy to make several varying versions to compare.

Software developments

Software developments in and outside our sector could create more possibilities in the future. Imagine we could combine visualisation software for set, light, video and mechanics, strength calculation models, (like used for example in models of historic wind mills, calculating all the forces on the equipment), gaming technology, virtual reality, and immersive technology.

This combination of contemporary tools would make it possible to create a model where we can virtually walk through, while the action goes on and we can choose to see the forces, the lights strengths, etc. Remains the question if this can replace the physical touch, the adaptation of the eye or the presence of the fellow audience members.

Heritage

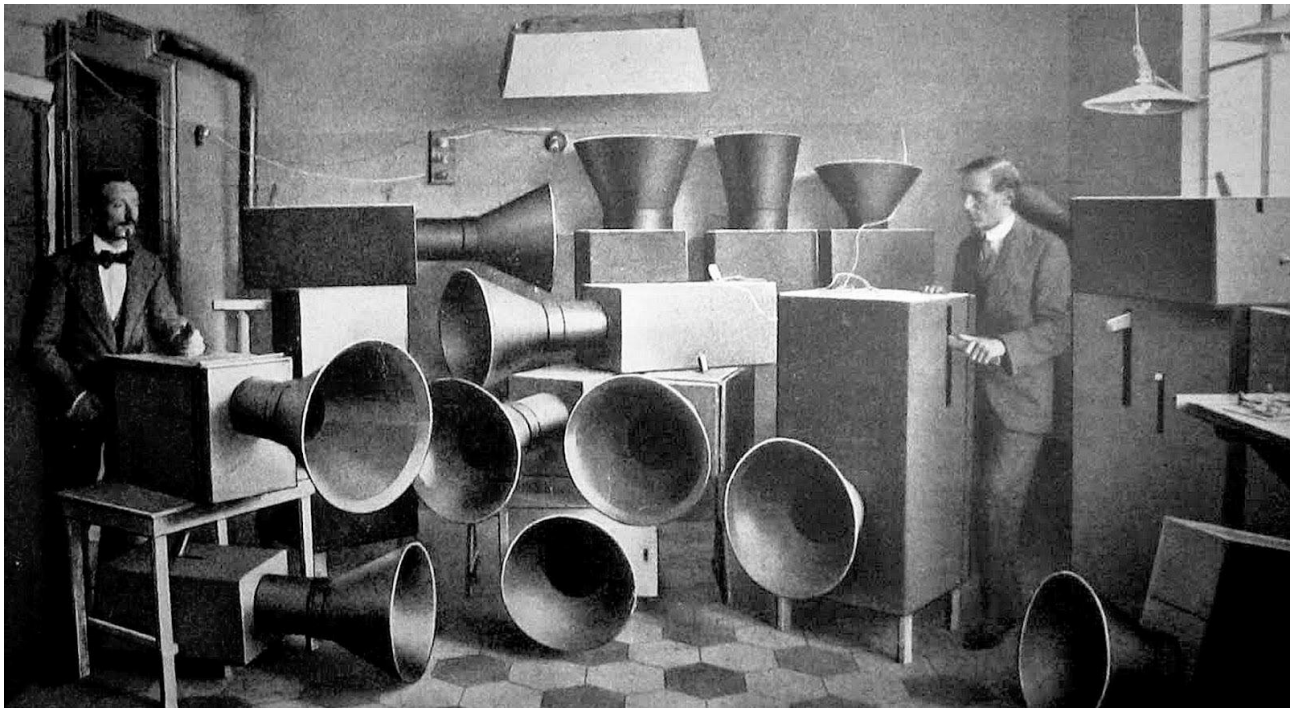
It will be clear that the use of models can be of use in a heritage context. Our target group is practical, we want to see, to touch, to try, to feel, … The sensory experience is essential for the understanding of the represented reality. Models are essential for the preservation of what is gone, for researching what is narrated by history, and to present the results in an understandable way to a wide audience.

How do we make our history visible?

Collections are like books: they work best when opened. All the work of collecting and researching our heritage only makes sense if we can finally bring it to an interested audience, if we can "unlock" it.

The general perception seems to be that our audience is rather limited and only composed of professionals and "tech freaks". But the reality could be different. When we presented our scale one to four model in open air, our most interested audience were children that wanted to play with it, touch it, understand how it works. At the exhibition of theatre technology between 1945 and now, general audience members loved to stand at the sound desk, looking at the history from the point of view of the mixer. It all depends on how we present it. But the reality remains that it is a limited audience for a subject that needs a lot of expensive space.

Ideally a collection should be showcased in a museum, and this museum should be in the middle of a large, culture-minded city. The chance that this will happen in the next years is rather small. Museums have a hard time to survive and a space that could host a collection of large pieces would cost a fortune, especially one in the centre of a theatre district. The only museum that focussed on this subject, the Danor lighting museum in Israel, was bought by a Chinese company and shipped to China. In most museums, technical theatre will, in best case, survive in deep storage or in stock.



Maybe, we need to redefine the museum. Maybe a technical theatre museum could be temporary, moving from one (museum) site to another? Maybe it could work on a European level, bringing together different collections without the need for physical ownership or centralised storage? Maybe exhibitions could tour? Isn't that exactly what our business is about? Bringing our ideas to the people? A touring collection could adapt to local needs, present in theatres, event places, trade shows, museums, etc. It could be used for openings of new or restored buildings, for anniversaries of historic figures, and so on.

Maybe we should also redefine the "exhibition", as a gathering of annotated objects. The objects in our collections are meant to be used, why don't we let the audience experience what it feels to mix music for ten thousand people? To create light? To move or paint sets? To play with Peppers' ghost? To fly or make explosions happen?

Involvement is the key to attract the audience. This can be done in several ways: immersive techniques, activities, and workshops are good ways to grab the attention of the general audience. But we could also attract the professionals, why don't we try a pop-up exhibition, where colleagues can bring their nicest pieces? Where you can record the oral history? Where you see students and researchers at work?

How do we prepare for the future?

The final question is, how we prepare for the future. What are the things that can be done to evolve from islands of collectors to a supported community?

Creating awareness

Creating awareness amongst the professional community is one of the first things that need to be done. Writing in technical and professional magazines and online presence are elements that can help. Spreading the news through national and international organisations like Unesco, OISTAT, EU, professional organisations, associations of theatres, manufacturers, etc. can help too.

Maybe we need to be more active in creating awareness. Could we make stickers to put on historic material with an emergency contact and a note of the importance? Could we spread a business card with measurements to take a picture from objects and send them for evaluation?

Building a community

"History is an action verb" is the title of a Dutch book about history research. We feel this is absolutely true. Safeguarding our heritage is an assignment that needs a group of people working together. No one can do this on their own, no one has the combined skills, the different insights.

In the last year several initiatives about history have brought people together, mostly in the sideline of other events. The presentation of Backstage archive initiative at Plasa London, the Perspectiv meeting in Warsaw, the OISTAT technology commission, "Stage, Set, Scenery" in Berlin, the Time Line and research commission meetings at PQ in Prague, all have brought practitioners and researchers together. Online initiatives like the Archiving technical theatre heritage Facebook group keeps these groups connected. But these networks could be supported more. Information could be spread better, these networks could form the basis for collecting good practices and developing common standards.

Most of these communities are a bit of an "Old men's clubs", they could get more student involvement. Organising a heritage summer camp or inviting students to their meetings could strengthen this bond.

Developing a common vision

At the moment there is hardly a common vision on the safeguarding, collecting, cataloguing and presenting of technical theatre heritage. Developing a common vision would strengthen the collectors' community and would give a strong and "unisono" signal to the outside world. A clear vision on what to keep and how to keep it could influence legislation and policy makers and make maintaining the technical archives part of the general archiving duties of each organisation.

Share good practice

There are probably already a lot of good practices concerning collecting and safeguarding these objects and documents out there. But we need to find them. It would help collectors and museums in search for methods, standards, etc. Concrete examples could be:

- Manuals for safeguarding, restoring and repairing equipment
- Standards for documenting equipment
- Methods for oral history collection
- Ideas for presenting and exhibiting

Promote Research

There is hardly any research in the field of technical theatre. A community could promote research by proposing research questions to universities and supporting students that work on these. A common online library and the exchange of publications could bring disciplines together. New fields can be discovered, think of the Asian and African technical history, conservation of computers, …

Teach

Teaching theatre technology is, a newbie when speaking in education terms, but in terms of the technological evolution it is very old. Most education programs hardly exist 25 years. In these 25 years there has not been one book about the history of our field from the point of view of the technician. What we know, we found in fragments and snippets in books that have a subject that is not ours and that is not written with the technological expertise we would expect. It would make sense to develop a textbook on technical history supported by an international community.

A sense of urgency

The trip we made in heritage land during the last three years has made us happy sometimes, for example when meeting driven collectors, and angry sometimes, when valuable objects were lost, hopeful when looking at all the new initiatives, but the main feeling we experienced is worry when looking at what is at risk and what needs to be done. We hope that our view on the reality can trigger people to get involved and support the efforts of many. There is a scent of urgency in the air.