## 13）リードオルガンの安定化処理
## －音の再生を目指して－

### １．大津波による被災

救出されたリードオルガン（海保製三省堂オルガン７ストップ、２スエル付き第十一号型風琴）は、19世紀初頭（明治38～大正２年）、三省堂器械標本部が海保社へ依頼し製作された国内現存３台の内の１台です。岩手県気仙郡気仙村（現陸前高田市）気仙尋常高等小学校で教鞭をとられていた女教師が、同校退職後の1931（昭和6）年に開園した私立高田幼稚園に自費で設置し、使用してきたオルガンです。その後、福祉施設「私立高田保育園」を経て市立高田保育所に移行される昭和34年まで、29年間にわたり使い続けられました。女教師の死後ご遺族から陸前高田市立博物館に寄贈され、以後博物館で陸前高田市における幼児教育の先駆者の証として大切に保管され、活用されてきました。

震災時、収蔵庫に収納されていた他の資料と共に大津波で被災し（図1）、裏板に大きな傷を受け、内部に多量の土砂や松の葉などが流入しました（図2）。５月、陸前高田市職員らによって救出され、仮設陸前高田市立博物館に運び入れられました。

### ２．救出されたリードオルガンの再生

#### 2-1　応急措置

救出後、岩手日報の記者から日本リードオルガン協会の会員にオルガンの存在が知らされました。そこでまず、東北在住の会員が救出されたオルガン内部に流入した土砂等を除去し、この楽器の発音体であるリード（高音は短く、低音が長い金属製の弁）（図3）の状態を確認しました。その結果、発音体は津波による損傷が少なく、修復すれば楽器として再生できることがわかりました。

#### 2-2　安定化処理

安定化処理は脱塩、除菌、除泥を基軸に行われます。しかしながら、対象とする資料は楽器です。加えて、明治期の楽器には製作の過程で接着剤として膠が用いられています。水洗や水浸といった処理を施すことによって生じる木材の微妙な変形と膠の溶出による部品の崩落を考慮し、今回の措置では笛室と響板を除き、その実施を見合わせました。

仮設陸前高田市立博物館で殺菌のための燻蒸を行った後、長野県の工房に運び、音の再生に支障がない箇所について、スチームクリーナーを用い、浮き出てくる汚れを拭き取りながら、脱塩と除泥を進めました（図4）。措置後、パッシブインジケータによる検査（図5）を行い、オルガンから揮発性化学物質の発生が確認されなくなるまで、クリーナーによる汚れの除去を続けました。

#### 2-3　修復

可能な限りの安定化措置を施した後、楽器としての機能回復を目的に修復を行いました。足踏みオルガンという楽器は、空気の力によって金属製のリードを振動させ、木

## 13) Stabilization Treatment of Reed Organ
## – Efforts toward the Sound Restoration –

### 1. Damaged by the Massive Tsunami

The salvaged reed organ, a 7-stop, 2-swell, the eleventh type called Fukin organ manufactured by Kaiho and marketed by Sanseido, was manufactured on commission by Sanseido's Machine Sample Department at the beginning of the 19th century (from 1905 to 1913).This is one of the three reed organs manufactured at that time that still remain in Japan. Looking back on the history of this organ, a former school teacher at Takekoma Senior Elementary School in Kesen-mura, Kesen-gun in Iwate Prefecture (currently Rikuzentakata City) installed the organ at her own expense at aprivate Kindergarten called Takata, which opened after she left the school, in 1931. The teacher used the organ for 29 years at the kindergarten and then at the "Takata Nursery School", a welfare facility, until 1959 when the private nursery school became a municipal nursery called Takata Nursery. After the death of the teacher, her family donated the organ to theRikuzentakata City Museum(RTCM). Since then, the museum had stored and utilized the organ with the utmost care, as proof of a pioneering figure of preschool education in Rikuzentakata City.

The organ was damaged in the Great East Japan Earthquake and tsunami in March 2011 along with other materials that were housed in the museum archives (Fig. 1). The organ's backing plate sustained a major tear as a substantial amount of dirt, sand, pine leaves and other substances were deposited inside (Fig. 2).The organ was salvaged in May of that year by Rikuzentakata's municipal workers and brought to the temporary building of the RTCM that was rebuilt after the disaster.

### 2. Restoration of the Salvaged Reed Organ

#### 2-1 Emergency Measures

After the salvage operation, a reporter for Iwate Nippo, a local newspaper, told a member of the Reed Organ Club of Japan about the existence of the salvaged organ. Then, a member of the Club residing in the Tohoku region initially removed the dirt, sand and other substances deposited inside the organ and assessed the condition of the reed (metal valves: short valves for high notes and long valves for low notes) (Fig. 3), a sound-producing component of this instrument. As a result, the member found that the damage caused by tsunami on the reed, or the sound body, was minor and that repair works should be able to restorethe organ as a functioning musical instrument.

#### 2-2 Stabilization

Desalination, sterilization and dirt removal form the core of stabilization treatment. However, the document subject to treatment this time was a musical instrument. Another factor that compounded the process was the hide glue used as an adhesive agent in the manufacture of musical instrument during the Meiji Period. After some consideration, it was decided the stabilization treatment was to be applied only to the wind chest and sound board in view of the possible adverse effects of washing and immersing the components in water, which include the subtle deformation of wood and damage to parts caused by the leaching of glue.

図1　修復前のオルガン
Fig. 1　Organ prior to restoration

図2　オルガン内部に混入した砂
Fig. 2　Sand deposited inside the organ

図3　オルガンの発音体である金属製リード
Fig. 3　Metal reeds that function as the organ's sound-producing component

図4　スチームクリーナーによる洗浄
Fig. 4　Parts were washed using a steam cleaner

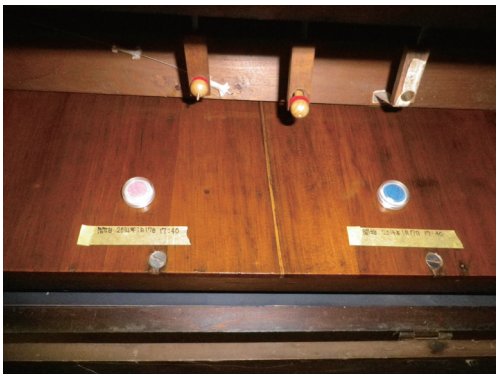

図5　パッシブインジケータによる測定
Fig. 5　Measurement is taken using a passive indicator

図6　各鍵盤に対応したバルブ開閉用のスプリング。海水により腐食破損している
Fig. 6　The spring that opens/closes the valve for each key, damaged and corroded by seawater

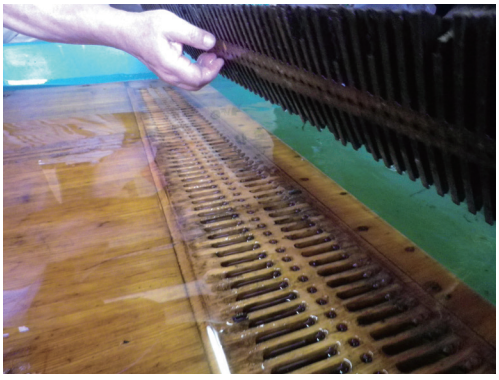

図7　響板と笛室の分離
Fig. 7　Sound board is separated from the wind chest

図8　分離後の笛室を水道水で洗う
Fig. 8　The wind chest is washed with tap water after separation

製の楽器全体に共鳴させることで豊かな音を響かせます。

左右のペダルを踏むことで空気袋の中の空気が排出されます。空気袋が空に近い状態になったところで、鍵盤を弾くと連動したバルブが開き空気が大袋に吸い込まれて行きます。その過程でリードを振動させ、音が出るという仕組みになっています。バルブを開閉するスプリングが海水によって腐食破損したため（図6)、大袋に空気が吸い込まれず、弾いた鍵盤が落ちたまま上がってこないという状況が生じていました。そこで、破損したスプリングはもとより、破損していないスプリングも大事をとって交換しました。

リードの音を鳴らすための重要な部品の一つに笛室が有ります。リードが差し込まれている部位は朴の木で作られています。松材でできている響板との接着が剥がれていたため、リードの振動を伝えられなくなっていました。そこで、水道水に浸し響板と笛室を分離し（図7、8)、脆くなった部分（図9、10）を可能な限り取り除き、同じ朴の木を充填、調整した後（図11、12)、響板と笛室を再接着しました（図13)。音の再生を果たすうえで、最も重要な工程で、その措置には細心の注意を払いました。革やフェルト類は全て新しいものに交換（図14、15）しました。楽器に使用されている金属は主に鉄、真鍮ですが、発生したサビを除去するため、金属ブラシとサンドラバー、スチールウールを使用しました。錆を除去した後研磨し、楽器用防錆剤を塗布しました（図16)。

修復後に楽器として演奏に耐えうる事を絶えず念頭に置き、被災前の状態に復することを目指しての作業でした。修復が終了したリードオルガンは再び仮設陸前高田市立博物館に運び入れられ、経過観察に付されています。2014年8月には仮設陸前高田市立博物館で開催された被災文化財再生をテーマとするワークショップ内での音出調査、2015年1 ～ 3月には東京国立博物館で開催された安定化処理をテーマとする企画展、同年10月、陸前高田市コミュニティーホールで開催された「よみがえった奇跡のリードオルガン演奏会」が実施され、当初の目的である音の再生に成功したことが確認されました。今後も注意深く措置後の変化を観察していきたいと考えています。

**和久井真人（日本リードオルガン協会会員）**

The organ was brought into a workshop in Nagano Prefecture after it was fumigated for sterilization at the temporary building of the RTCM. Desalination and dirt removal treatment was applied on parts that would not hamper sound restoration while using a steam cleaner to wipe the dirt that had leached to the surface (Fig. 4). Its condition after the treatment was assessed using a passive indicator (Fig. 5). Restorers continued to remove dirt with a cleaner until they could no longer detect any volatile chemical substance being discharged from the organ.

### 2-3 Repairs

After applying as much stabilization treatment as possible, restorers attempted to repair the organ to revive its functions as a musical instrument. In pump organs, the force of air is used to vibrate the metal reeds and resonate the sound throughout the entire wooden instrument to create a rich sound.

The action of depressing the right and left pedals draws air out of the bellows. Then the action of pressing a key when the exhaust bellows have become almost empty causes the inside valve to open, suctioning air into the reservoir and initiating sound. This is the mechanism of the reed organ. In the case of the salvaged organ, the springs that operate the valve had been corroded and damaged by seawater (Fig.6). This resulted in a condition where air did not flow into the reservoir and a depressed key remained stuckand did not return to its original position. To be on the safe side, the springs that had sustained little damage were also replaced in addition to the damaged springs.

The wind chest is a crucial component in reed sound generation. In this organ, Japanese Bigleaf Magnolia was used for the wind chest section in which the reed was inserted. The wind chest did not transmit the reed vibration because it became unglued from the sound board made of pine wood. To repair this, the restorers immersed the sound board and wind chest in tap water to separate the two components (Figs. 7 and 8) and removed the brittle parts (Figs. 9 and 10) as much as possible. After filling the section with Japanese Bigleaf Magnolia as in the original and adjusting the section (Figs. 11 and 12), the sound board and wind chest were glued together again (Fig. 13). Restorers exercised extreme care during this treatment, which constitutes the most important process in sound restoration. All parts made of leather, felt and fabric were replaced with new materials (Figs. 14 and 15). Restorers used a metal brush, elastic grinder and steel wool to remove rust that infected the metal parts used in the instrument, mostly iron and brass. Anticorrosive agents for musical instrument were applied on metal parts after rust removal and polishing (Fig. 16).

The researchers' goal of the restoration operation has always been to return the organ back to its pre-tsunami condition so that it can be being utilized again as a musical instrument. After restoration, the reed organ was brought back to the temporary building of the RTCM and kept there to monitor its conditions.A series of events since that time have served as a testament to the success of the organ's sound restoration, which was the initial aim of the project. The events are: playing the instrument during a workshop on the restoration of cultural assets damaged in the Great East Japan Earthquake held at the temporary building of the RTCM in August 2014; a planned exhibition on the theme of stabilization treatment held at Tokyo National Museum in January-March 2015; and "the restored 'Miracle' Reed Organ Concert" held in the Rikuzentakata City Community Hall in October 2015. We will continue to carefully monitor the condition of the restored reed organ.

**Makoto Wakui (Reed Organ Club Japan)**

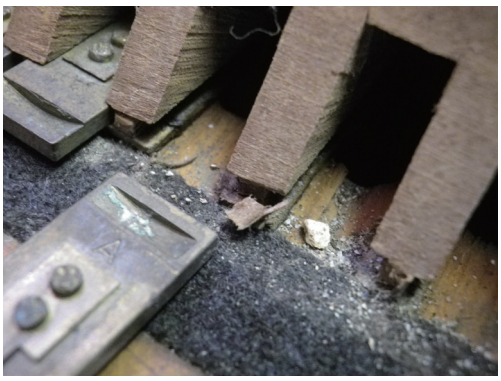

図9　金属製リードが差し込まれる部分
Fig. 9　The wind chest in which the reed is inserted

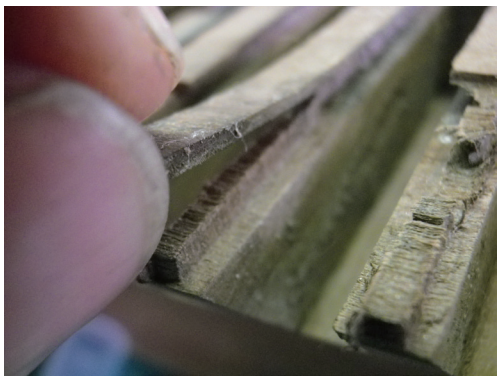

図10　笛室を裏から見る。木部が脆くなっている箇所がある。
Fig. 10　A back view of the wind chest exposes the wooden parts that have become brittle

図11　笛室の脆くなった部分を取り除き、新しい木を接着
Fig. 11　New wooden parts are glued to the wind chest after removing the parts that have become brittle

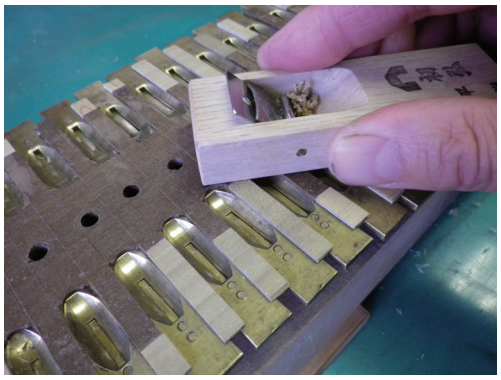

図12　リードを差し込んでリード室のレベルを調整
Fig. 12　Reeds are inserted to adjust the level of the room of the reeds

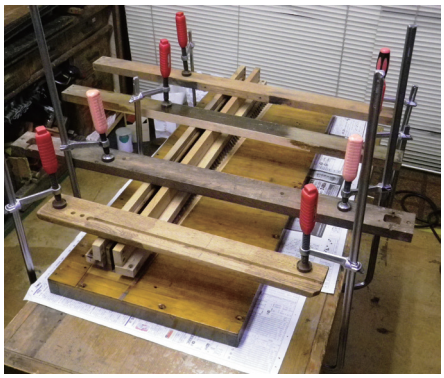

図13　分離した笛室と響板を再接着
Fig. 13　The separated components of the wind chest and sound board are glued together

図14　新しい革に貼替え
Fig. 14　New leather upholstered to replace the damaged leather

図15　鍵盤裏のクロスも交換
Fig. 15　The cloth behind the keyboard is another component that has been replaced

図16　スチールウールで金属を磨く
Fig. 16　Metal parts are polished with steel wool