

## 10) 登録有形民俗文化財「陸前高田の漁撈用具」の安定化処理および修復

### 登録有形民俗文化財「陸前高田の漁撈用具」

岩手県陸前高田市立博物館ではおよそ2万点の民俗資料が被災しましたが、その中でも最も体系だったコレクションの一つが登録有形民俗文化財「陸前高田の漁撈用具」です。同館は、陸前高田市内でも漁業が盛んな地域に当たる広田半島(図1)とその周辺地域で使用された漁撈用具を体系的に収集しており、その内2045点が、2008(平成20)年に国の登録有形民俗文化財となりました。この資料群は磯物採取・突漁・釣漁・網漁・製造加工・養殖・運搬等、広田湾を中心に使用された漁撈用具を網羅しており、近代以降の漁撈用具および技術の伝播や変遷について知ることができる貴重なコレクションです(文化庁文化財部2008)。東日本大震災により三陸地方一帯の漁村が甚大な被害を受け、各地に伝わる漁撈用具類の多くが流失したいま、本資料の重要性は一層高まっているといえます。

### 「陸前高田の漁撈用具」の被災状況

「陸前高田の漁撈用具」は市立博物館二階展示室および収蔵庫にて展示・保管されていました(図2)。2045点の資料群のなかには、数cmほどの細かな釣針や、5mを超える船なども含まれており、救出活動は困難を極めました。展示室から流失した一部資料を除き、全体の9割を

## 10) Stabilization and Restoration of the “Fishing Equipment of Rikuzentakata” (Registered Tangible Folk Cultural Properties)

Fishing Equipment of Rikuzentakata (registered tangible folk cultural properties)

Among the nearly 20,000 folk cultural assets owned by the RTCM in Iwate Prefecture that were damaged by disaster, the “Fishing Equipment of Rikuzentakata”, a collection of registered tangible folk cultural properties, was one of the most representative. The museum has been systematically collecting fishing tools used in the Hirota Peninsula and its vicinity where fishing practices are very common, especially within Rikuzentakata City, known for its large fishing industry (Fig. 1). Among them, 2,045 items were registered as national tangible folk cultural assets in 2008. This group of objects covers the fishing equipment used primarily at Hirota Bay in various fishing practices including sea snail collecting, spearfishing, angling, netting, processing, aquaculture, and transportation. It is a valuable fish collection which provides abundant information on the dissemination of and changes in the fishing equipment as well as techniques during past years (Cultural Properties Department, Agency for Cultural Affairs 2008). Following the loss of most of the fishing equipment that was handed down for generations in local communities, due to the damage caused by the Great East Japan Earthquake to the fishing villages of the entire Sanriku region, it can be said that these objects hold even greater value today.

超える1922点の資料の現存が確認されました。但し、その一切が海水損しており、一部資料は津波に巻き込まれたことによる破断・欠損などの物理的損壊を被っていました(図3)。また発災後一か月余りを経て救出された段階で、多くの資料の表面にはカビが発生し(図4)、また金属部を伴う資料は錆化が急速に進行していました。

### 安定化処理および修復を行う上での留意点

被災した民俗文化財が博物館資料として再生するためには、安定化処理が不可欠です。海水損した民俗文化財に対する安定化処理の実践は世界的に見ても前例がありません。その方法論を構築する上で、民俗文化財の素材の多様性の克服が課題となります。「陸前高田の漁撈用具」は木および金属を中心に、プラスチック・ガラス・岩石・藁・海藻・羽毛・繊維・骨角等、実に多様な素材によって構成されており、それぞれの性質に応じ、適切な処置を講ずる必要があります。また、安定化処理を行う際には、資料が具備する使用痕を損なうことがないように配慮することもまた求められます。

安定化処理が完了した後は必要に応じて修復を施すこととなりますが、民俗文化財の場合、修復対象資料が使用されている現地において、使用者または製作者(漁撈用具の場合漁師がそれに当たります)が日常的に製作・修復のために用いている技法および素材を民俗文化財の修復にも援用することが可能であると考えられます(石垣2014)。

The state of damage caused to the “Fishing Equipment of Rikuzentakata” by the disaster

Some of the “Fishing Equipment of Rikuzentakata” assets had been displayed in the second floor exhibition room of the RTCM (Fig. 2), and some had been stored at the repository of the museum prior to the disaster. As this collection of assets included small fishing hooks just a few centimeters long as well as vessels of longer than 5 meters, the restoration efforts were undertaken with extreme difficulty. However, except for some of the objects that were lost from the exhibition room, more than 90% of the assets, specifically 1,922 items, have been identified and salvaged. However, nearly all the salvaged objects were damaged by seawater, and some were physically damaged (Fig. 3), such as ruptures and partial loss of material, from getting immersed in the turbulent waters of the tsunami (Fig. 4). Furthermore, since more than one month had passed since the disaster when the objects were salvaged, at that stage mold had grown on the surface of most of the objects and rust was rapidly progressing in those assets containing metal parts.

### Precautions for performing stabilization and repair

Stabilization should be performed in order to restore disaster-damaged folk culture assets as museum objects. Worldwide, there is no previous example for stabilizing folk cultural assets damaged by seawater. The challenge of treating different raw materials used in folk cultural assets must be overcome first in order to develop effective stabilization methods. The “Fishing Equipment of Rikuzentakata” assets were made mainly of wood and metal, but they also contained a variety of materials including plastic, glass, rocks, straw, seaweed, feathers, fibers,





図1 東日本大震災発生以前の広田湾におけるアワビ漁の風景  
Fig. 1 Abalone fishing in Hirota Bay prior to the Great East Japan Earthquake



図2 被災前の「陸前高田の漁撈用具」展示風景（陸前高田市立博物館）  
Fig. 2 Pre-disaster display of the “Fishing Equipment of Rikuzentakata” (Rikuzentakata City Museum)



図3 「陸前高田の漁撈用具」被災状況  
Fig. 3 Disaster-damaged “Fishing Equipment of Rikuzentakata”



図4 カビが発生した海苔漉き網（登録有形民俗文化財、被災後）  
Fig. 4 Mold growth on *nori* seaweed filtering net (registered tangible folk cultural property, post-disaster)



図5 表面を石膏で保護して行う脱塩処理例  
Fig. 5 Example of desalination treatment employing surface protection by applying plaster



図6 地元漁師の民俗技術を活用した抜本修復  
Fig. 6 Fundamental restoration by a local fisherman utilizing traditional cultural techniques used by local fishermen



こうした現状をふまえ、2013（平成25）年度より陸前高田市立博物館は岩手県立博物館と連携し、文化庁伝統文化課からの指導を仰ぎつつ、「陸前高田の漁撈用具」の再生へ向けた本格的な取り組みを開始しました。

### 安定化処理および修復作業の具体

「陸前高田の漁撈用具」の安定化処理に先立ち、木および鉄の複合製資料である大工道具の鉋を対象に行った処理により、超音波洗浄機を活用した除泥、次亜塩素酸ナトリウム水溶液を使用した除菌、水道水および精製水に資料全体を浸漬させて行う脱塩を基軸とした方法によって、効率的な安定化処理を施し得ることが確認されました（目時2013）。この結果をふまえ、現在は表1に掲げる工程により「陸前高田の漁撈用具」に対し安定化処理を施しています。

この工程は長時間にわたる資料の水への浸漬とその後の自然乾燥を伴っており、仮設陸前高田市立博物館において大量の被災民俗資料の安定化処理を進める中で、自然乾燥の過程で木部に破断や変形等が生じる事例が確認されました。こうした資料劣化や、資料表面に残された使用痕の喪失が懸念される場合には、上に述べた処置の内、次亜塩素酸ナトリウム水溶液による除菌をガスくん蒸で代替するとともに、石膏で資料表面を保護し、脱塩以下の処理を行う（図5）ことにより対処しています（目時2014）。

安定化処理完了後、金属部を伴うものについては、予

め撮影していたレントゲン画像を参照しながら、新たに発生した錆をワイヤーブラシを用いて除去し、パラロイドB72の7～10%溶液を塗布することで、再度の錆化進行を抑制しています。

さらに資料の解体を伴う一層の処置や、破損部分の補修、形態の復元が必要なものについては、長年にわたり広田湾にて漁業に従事してきた漁師の方が持つ伝統技法を活用して修復が進められている（図6）ほか、一部の大型資料については公益財団法人元興寺文化財研究所にて安定化処理および修理が行われています。地元の漁師の方との協業による抜本修復作業の過程において、被災により大半が失われた「陸前高田の漁撈用具」に関する資料情報の再集成も進みました。

### 博物館資料としての再生へ向けて

このように博物館職員の独力では困難な工程については、地域の潜在的な民俗技術を積極的に活用することで補完可能であり、なおかつそれは資料情報の集積や博物館活動への市民参加にも直結し得るものであることが、「陸前高田の漁撈用具」の再生へ向けた一連の取り組みにより確認されました。

これは大津波被害により深刻な被害を受けた伝統的な生業に関する民俗技術の記録・保存にも結び付く意義深いものであるとともに、平時における博物館活動の在り方にも示唆を与えるものと考えられます。

同様の処置は「陸前高田の漁撈用具」以外の被災民俗

bones, horns and fangs. An appropriate treatment must be developed with consideration to the properties of each material. Furthermore, the signs of normal wear and tear on the objects must be kept intact when performing the stabilization.

When the stabilization is completed, repair work is performed as needed. In the case of folk cultural properties, it can be argued that the production and restoration techniques on the assets used normally by the users or craftspeople (fishermen in case of fishing tools) in the local community where the relevant folk cultural property has been in use can be incorporated when restoring folk cultural properties (Ishigaki 2014).

In light of the current conditions as described above, in collaboration with the IPMM, the RTCM initiated full-scale efforts to recover the “Fishing Equipment of Rikuzentakata” in 2013, and have been working on the task since, while obtaining guidance from the Traditional Culture Division of the Agency for Cultural Affairs.

### Specifics of the stabilization and repair work

Based on the results of experimental treatment on a plane, a construction tool which is made of wood and iron, conducted prior to performing stabilization techniques on the “Fishing Equipment of Rikuzentakata”, it was confirmed that efficient stabilization can be performed by a method based on dirt removal utilizing an ultrasonic cleaner, sterilization using a sodium hypochlorite solution, and desalination by soaking the entire salvaged material in tap water as well as purified water (Metoki 2013). Based on these results, stabilization is currently being performed on the “Fishing Equipment of Rikuzentakata”

by the process presented in Table 1.

Because this process includes soaking of the salvaged objects in water for an extended period of time and a subsequent air drying step, while performing stabilization on a large amount of disaster-damaged folk culture objects, in some cases the wooden parts of the items fractured or deformed during air drying. When there are concerns over the possibility of item degradation or a loss of signs of normal wear and tear from the item surface while using the above mentioned treatments, sterilization using a sodium hypochlorite aqueous solution is replaced by gas fumigation. In addition subsequent treatments of desalination were performed after protecting the item surface with plaster (Fig. 5) (Metoki 2014).

Following the completion of stabilization, while referring to the X-ray images taken in advance, newly occurred rust on the items with metal parts was removed using a wire brush, and any further progress of rust was controlled by applying a 7 to 10 % Paraloid B72 solution on the items.

Salvaged objects requiring further treatments that involve disassembly, mending of damaged parts, or recovery of the original shape, are being restored utilizing traditional techniques practiced by the fishermen who have been engaged in fishing practices in Hirota Bay for a long time (Fig. 6). In addition, some large objects are being stabilized and repaired at the Gangoji Institute for Research of Cultural Property. The project of re-aggregating informational material concerning the “Fishing Equipment of Rikuzentakata”, which was lost for the most part in the disaster, also progressed by performing fundamental restoration in collaboration with local fishermen.

文化財の再生へ向けた取り組みにも適用されています。但し「陸前高田の漁撈用具」の一つである鯨油石鹸に象徴されるように、水洗した場合資料に不可逆的な劣化・変質を及ぼす危険性がある資料をいかに安定化処理するかという点については、克服すべき課題として残されています。現在もお全国の関係機関が連携し、こうした水洗が困難な資料の安定化処理に関する方法論の構築に向けた取り組みが続けられています。

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#### Toward reviving salvaged objects as museum assets

As described so far, processes that are difficult to perform by museum staff alone can be supplemented by proactively utilizing the folk culture techniques of the local community. Furthermore, it has been confirmed through the series of procedures undertaken for recovering the “Fishing Equipment of Rikuzentakata” that such utilization of traditional local techniques can directly lead to citizen’s participation in informational material exchange and museum activities.

This is a meaningful activity that leads to the recording and preserving of folk culture techniques related to traditional sources of livelihood which were seriously affected by the tsunami. At the same time, it may provide suggestions on how museum activities should operate in normal (i.e. non-crisis) times.

In addition to the “Fishing Equipment of Rikuzentakata”, similar treatments are being applied in the efforts to recovering other disaster-damaged folk cultural assets as well. However, a problem still remains on how to stabilize objects that may irreversibly degrade when washed with water, as in the case of one of the fishing products of Rikuzentakata, whale oil soap. Today, relevant agencies across Japan are collaboratively working on projects for building methodologies for stabilizing materials that are difficult to wash with water.

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表1 水洗が可能な海水損民俗文化財の安定化処理工程

- ① X線透過撮影による資料内部構造の確認。
- ② 流水（水道水）に浸しながら、資料表面に固着した土砂を刷毛およびブラシにより除去。
- ③ 次亜塩素酸ナトリウム水溶液（市販されている12%溶液を水道水で希釈し、400ppmに調整したもの）に15分間浸漬した後、水溶液中で刷毛を用い資料表面をクリーニング。資料を水溶液から取り出し、流水で洗浄。
- ④ 水道水を用いて15分間超音波洗浄処理。
- ⑤ 水道水に浸漬し脱塩処理。
- ⑥ 24時間毎に塩化物イオン濃度および電気伝導度を測定。塩化物イオン濃度および電気伝導度がそれぞれほぼ水道水と同レベルの6ppm、7mS/m以下に達するまで脱塩を継続。
- ⑦ 目標値に到達した後、精製水に72時間浸漬し、塩化物イオン濃度および電気伝導率がそれぞれ6ppm、7mS/m以下にあることを確認し、脱塩処理を終了。
- ⑧ 金属部の表面に浮き出た錆を、ステンレス製ブラシを使い除去。
- ⑨ 素材・形状に応じ真空凍結乾燥または自然乾燥を実施。
- ⑩ 乾燥した資料をくん蒸。
- ⑪ 脱酸素剤を入れたガスバリアフィルムの中に資料を入れ密封。
- ⑫ 資料の経過観察。

Table 1 Stabilization process for seawater-damaged folk cultural properties that can be washed in water

- 1) Confirmation of the interior structure of the salvaged object using X-ray imaging
- 2) Removal of dirt and sand affixed onto the surface of the object using a large brush and a standard brush while soaking the object in running water (tap water)
- 3) After soaking the object for 15 minutes in a sodium hypochlorite aqueous solution (prepared by diluting a commercial 12% solution with tap water to adjust the concentration to 400 ppm), the surface is cleaned using a large brush while still placed in the solution bath. Then, the object is removed from the solution and is washed with running water.
- 4) 15 minutes of ultrasonic cleaning using tap water
- 5) Desalination by soaking in tap water
- 6) Levels of chloride ion concentration and electric conductivity are measured every 24 hours. Desalination is continued until the levels are reduced to values close to those of tap water; chloride ion concentration of 6 ppm or less and electric conductivity of 7mS/m or less.
- 7) After the levels reach the target values, the material is soaked for 72 hours in purified water. Desalination is completed after confirming that the chloride ion concentration is 6 ppm or less and the electric conductivity is 7mS/m or less.
- 8) Removal of rust on the surface of metal parts using a stainless steel brush
- 9) Depending on its materials and shape, the object is either vacuum freeze dried or air dried.
- 10) Fumigation of dried material.
- 11) The object is placed in a gas barrier film containing an oxygen absorber and the film is sealed.
- 12) Follow-up observation of the object.