



## CREATIVITY-BASED INTEGRATION PEOPLE WITH LIMITED OPPORTUNITY ON THE EXAMPLE OF CREATING ARTISTIC PRODUCTS OF METAL CLAY

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### ABSTRACT

This study applies low cost material to build creative specimens. Several areas of possible testing include compression, and bending. The organization of events with the joint participation of healthy people and people with disabilities in creative activities contributes to the formation of a barrier-free environment. This is the creation of medical and labor workshops, creative festivals, exhibitions and fairs. When there is an opportunity not only to submit their own products to the competition, but also to sell them, having received monetary rewards for their creative works. All this also contributes to the erasure of the psychological framework in communication of people with disabilities with people without disabilities. With creations under a barrier-free environment, creativity is one of the effective ways to integrate people with disabilities into society.

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## 1. INTRODUCTION

The right of access to cultural property, participation in cultural life and in creative processes, refers to the fundamental rights of an individual, guaranteed by the state. The surrounding space should be accessible to all people, which is not fully realized in relation to people with disabilities. Very often people with disabilities face the problem of socio-cultural isolation. Universal design is a design that is convenient for everyone without exception; society should not divide people into categories, into “people with disabilities” and “healthy”. A society cannot be complete without the involvement of people with disabilities in it. Adaptation through creativity is aimed at creating a full-fledged environment and conditions under which the creative activity of the disabled person, his creative achievements become an integral part of the general culture of society. The method of creating art products proposed in the article allows integrating people with such disabilities into the

society: the deaf, hard of hearing, with disorders of the musculoskeletal system and people with limited mobility [1].

## 2. MATERIALS AND METHODS

For any art work an important factor is the choice of material. It must have functional and aesthetic properties, be environmentally friendly, durable and easy to process [2-6]. New material of recent years, meeting the requirements is steel metal plastic masses.

The idea of creating a metal with the properties of ceramic clay belonged to the Japanese scientist Dr. Masaki Morikawa, an employee Mitsubishi Materials Corporation. July 12, 1994 Mitsubishi Materials Corporation of Japan received a patent number 5328775 for a product that received PMC name (Precious Metal Clay) [7, 9]. In its composition, the material contained powders of precious metals and a plasticizer - a water-soluble binder. Plastic metal masses based on pure precious metals consisting of pure silver or gold were created first. In the last two years (2016-2017), powders of alloys of non-ferrous and ferrous metals, such as bronze, brass, steel, were obtained [6].

The relationship between the stress and the strain is given by a stress-strain curve as shown in Figure 1. To determine mechanical properties for each material such as the modulus of elasticity, an algorithm involving the linear regression was created. The algorithm begins by storing all the data points between the initial start point and the maximum peak point (ultimate strength). It is then that the stored data set is split into approximately six equal sets with zero overlap. Within each region, a linear regression is performed in order to determine the slope of the line, for each portion.

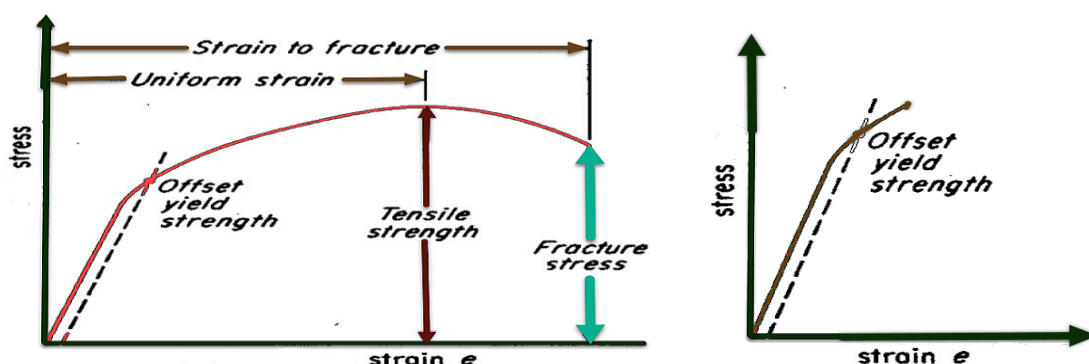


Figure 1: Stress-strain curves for ductile and brittle materials.

## 3. RESULTS

The material combines the properties of metal and ceramics, so the shaping operations are similar to the processing of clays, after firing in a muffle furnace, the product acquires all the properties of metals, the subsequent finishing operations are similar to the processing of metals (Figure 2) [13-15]. Plastic metals provide new potential opportunities needed to implement the ideas of the artist. The

material is easy to process and does not require complex equipment (Figure 3).



**Figure 2:** Creating a pendant based on natural materials using plastic metal paste in the form of a paste [13]



**Figure 3:** Tools for work [5]

These materials and technologies may interest people with disabilities. Such an effective way of rehabilitation of people with disabilities, such as clay therapy [11], which is basically based on work with plastic material, has long been known and used. Working with plastic metals can help people with disabilities believe in themselves and their capabilities, rehabilitate and integrate into society, uncover and realize their creative potential. Unusual jewelry (Figure 4) and souvenirs (Figure 5) can be created from plastic metals, which can become not only a hobby, but also an opportunity to earn [3-4].

Engineering materials can utilize several mechanical tests to measure strength. Specimens are destroyed in the test process. Perhaps the most common experiment is the tensile force. Hardness is usually defined in terms of resistance of the material to penetration by a hard ball or point. Specimens are affectionately called dog bones. This is because of the shape is a bar with larger sized ends. We used the ASTM standards [5] for metal testing using our specimen design.

A person is a social being with a need for communication and interaction with other people, hence the importance of the integration of people with disabilities into society [12]. Creativity is the

highest form of activity inherent in man alone, one of the foundations of human life, culture, its result is the manifestation of the essential qualities of a person. The role of creativity is so important in a person's life that it is used as a restorative art therapy. Therefore, people with disabilities often find an outlet to their potential in the works. A person isolated from the world due to illness can create works of art [17].



**Figure 4:** Examples of products from plastic metal masses  
Mitsubishi Materials Corporation MJC[8]



**Figure 5:** Bronze figure "Usarobo001" made of metal plastic mass

#### 4. CONCLUSION

The material used is low cost, and many more specimens can be produced. Several areas of possible testing include compression, and 3 bar bending. The organization of events with the joint participation of healthy people and people with disabilities in creative activities contributes to the formation of a barrier-free environment. This is the creation of medical and labor workshops, creative festivals, exhibitions and fairs. Where there is an opportunity not only to submit their own products to the competition, but also to sell them, having received a monetary reward for their work. All this also contributes to the erasure of the psychological framework in communication of people with disabilities with people without disabilities [14-16]. So, it can be concluded that to create a barrier-free environment, creativity [10] is one of the effective ways to integrate people with disabilities into society.

## 5. REFERENCES

- [1] "Man and Science" Petrosyan Vladimir Arshakovich Minister of the Government of Moscow, Head of the Department of Labor and Social Protection of the Population of the City of Moscow: <http://cheloveknauka.com/integratsiya-invalidov-v-rossiyskoe-obschestvo>  
<https://www.mos.ru/dsxn/structure/person/20740093/> [Electronic resource] (access date: 16.04.2018).
- [2] Livshits, V.B. Kumanin V.I., Sokolova M.L. Art materials: jewelry: a textbook for academic undergraduate - 2nd ed., Revised and add. - M.: Publishing house Yurayt, 2018, 208 p. - (Series: Universities of Russia).
- [3] Kumanin V.I., Livshits V.B. Materials for jewelry. M.: Astrel, 2012, 240p.
- [4] Boyko Yu. A., Dryukova A. E., Kazachkova O. A., Komissarova L. A., Livshicz V. B., Navroczkij A.G. material processing technology. Moscow, OntoPrint Publ., 2016. (In Russian).
- [5] Moldable mixture of metal articles: USA patent 5328775; claim 11/18/1992; issued 07/07/1994. [Electronic resource] Access mode: <http://www.google.com.ua/patents/US5328775?hl=en> (access date 04/16/2018).
- [6] Sokolova M.L. Modern problems of the direction "Technology of artistic processing of materials." // Russian technological journal. – 2017, 5(1), 50-56.
- [7] Metalclay Studio [Electronic resource] Access mode: <http://www.metalclaystudio.ru> (access date 04/04/2018).
- [8] PMC (Precious Metal Clay) [Electronic resource] Access mode: [http://www.mmtc.co.jp/pmc/how\\_to\\_make.html](http://www.mmtc.co.jp/pmc/how_to_make.html) (access date 16.04.2018).
- [9] Mitsubishi Materials Corporation [Electronic resource] Access mode: <http://www.mmtc.co.jp/en/products/pmc.html> (access date 16.04.2018).
- [10] ART CLAY RUSSIA [Electronic resource] Access mode: <http://www.artclayrussia.ru> (access date 04.04.2018) [Electronic resource] Access mode: [http://www.bijou.marydoll.ru/metal\\_clay/art\\_clay\\_and\\_pmc.html](http://www.bijou.marydoll.ru/metal_clay/art_clay_and_pmc.html).
- [11] Tim McCreight. PMC Decade: The First Ten Years of Precious Metal Clay. BrynmorgenPress, 2006, 256 pages.
- [12] Vichulen E.V. Content and methods of sociocultural rehabilitation of persons with disabilities <https://yadi.sk/i/dSsQAr6z3VPgcf> [Electronic resource] (access date 16.04.2018).
- [13] Shulga E.M. Creativity as a way to integrate people with disabilities into society <https://www.scienceforum.ru/2016/1559/17145> VIII International Student Electronic Scientific Conference "Students' Scientific Forum - 2016" [Electronic resource] (access date 16.04.2018).
- [14] Kazachkova O.A., Kulishova E.A. The creation of jewelry, the design of which is based on the exact reproduction of the form and texture of natural objects. Collection of scientific papers. Edited by Bulatov MF. 2017 Publisher: Moscow Technological University (MIREA) (Moscow) p.: 542-545 <https://elibrary.ru/item.asp?id=29247670> (access date 04/16/2018).
- [15] Kazachkova, O.A. Zيابneva, O.A. Mamedova, I.Y. Kulishova, E.A. 3D technologies in the production of jewelry with elements of complicated design. International Journal of Engineering and Technology(UAE), 7(3), 2018, 155-157.
- [16] Kazachkova O.A., Kulishova E.A. Design and manufacturing technology features art products of small forms from metal plastic masses. Russian scientific and technical conference with international participation. Informatics and technology. Innovative technologies in industry and Informatics (RNTK FTI - 2018) [Electronic resource]: Collection of reports conference "Informatics and

technology. Innovative technologies in Industry and Computer Science” Moscow Institute of Physics and Technology. technological university. - M .: MIREA, 2018, 944 p.

[17] Abdullah L.S., Kukushkina V.A., Kantaryuk E.A.The Perspective Of Using 3d-Modeling In The Designing Of Technological Solutions For Chassis Design. International Journal of Engineering and Technology (UAE), 2018, 7(2), 13-15.

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