

Redefining Materiality: Physical Relationships of Materials in Comparison to Clay

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Abstract. Clay and its ceramic counterparts are one of the most prominent materials used within contemporary society. There is countless integration amongst the development of our surrounding world from utilitarian vessels to electrical conduits to space shuttle tiles. With that said, it can be argued that in nearly all areas of efficiency as a physical and malleable material, clay through its various states proves to be the superior medium. Yet what components of clay allow for such an efficient and malleable medium when compared to others? As the proponents of manipulation with materials will allow, I will be attempting to create a series of works replicating the effects of clay as material through wood, metal, plaster, fiber and plastic. Each piece will contain a clay portion and the additional collaborative material. The purpose is to relate the physical nature of materials and their relevance towards one another. The results will provide a symbiotic representation of the essential proponents of individual material advancements to effectively recreate clays' diverse material tendencies.

Introduction.

The material nature of clay and its process to become ceramic ware is unique amongst any other medium in contemporary art. Not only does its utility often transcend the art medium but its history and contemporary functionality is vastly overwhelming. As with all art mediums, the artist must categorize their medium into specific classifications. It is often necessary to realize the relationship the medium may hold to your idea and find the appropriate means to execute your thought articulately. Yet when it comes to any material, clay has by far the most versatile and practical uses over any other medium. Other materials may have certain functions and relationships to any one particular aesthetic choice but clay nearly holds all of them. With materials it is useful to understand the malleability of your substance, its workability, its process of production, the longevity of its existence, its rigidity and density, the level of heat resistance, and its relationship to the environment. Through my research, I will clarify and support the validity of clay as the quintessential, transformative medium.

Research.

My investigation begins with incorporating foreign materials into clay at its malleable state. I put paper, cardboard, plastic, steel, wood and plaster into the clay while continuing to work with its form. Some of the reactions were easily predictable and others created somewhat of a surprise. In order to fully articulate the process and results, I will separate each material exploration with into individual studies. In these studies I will present the hypothesis and result while also relating the process of clay amongst the designed functional uses of the material.

The ceramic process is one comprised of weeks' worth of effort and accumulation that is determined through multiple firing processes. Clay for starters is a malleable, pliable substance that is manipulated in a wet state and left to dry. The drying process is broken down in two primary stages, leatherhard and bone dry. Once bone dry, the clay is fired for the first time in a process known as bisque firing. During this stage, the clay is brought to temperatures as low as 1700°F/927°C and as high as 1940°F/1060°C (Fig. 1 left). When finished the piece is removed and glazed to finish and seal the porosity of the clay surface. It is fired once more in the glaze firing, which reaches between 1940- 2400°F/1060-1316°C. Each of the materials was exposed to the entirety of the ceramic process to completion to yield the full spectrum of results.

With that basic model of the ceramic process in mind, I begin my comprehension of material with paper, cardboard and its father substance, wood. Paper products, as a material, are delicate, flimsy, weak, absorbent, biodegradable and combust at 451°F/233°C. Therefore within every step of the ceramic process the paper ceased to exist within its original form. This makes it an excellent additive to clay in the process of making but as for its function as a material it is rather limited. To my surprise, when the paper burned away during the bisque firing there was small, crumbly parts of ash that until touched maintained some form of the original paper. In conjunction to paper, Wood as a material is absorbent and biodegradable but is rather rigid, hard and strong. The combustion process begins at 451° F/233°C but will continue to burn to 900°F/ 482°C, collecting ash of the materials' core elements until the heat will actually melt the ash into a glassy substance. Most of woods'

pliable abilities require water and/or steam to even render curves and movement. It is not easily possible to bend wood with your bare hands without steaming it first.

Plaster is a gypsum material that when stirred with water causes an exothermic chemical reaction that causes it to harden. As a material it is quite useful to create forms and cast objects with but with the understanding that it hardens rather quickly. Therefore its malleability is minimal at best. Once hardened it becomes a dense but rather soft and absorbent surface that can be manipulated easily through many carving techniques. Since plaster is a very absorbent substance, even once it has retained its hardened form time and water will cause the plaster to degrade slowly. When processed through the ceramic firing process the calcium creates deposits into the clay that have been known to cause large blow-outs in the clay surface. Plaster by itself disintegrates and releases carcinogens at low temperatures which aren't of much use during any heating process. Due to the nature of plaster within a ceramic environment, I fired minimal amounts of plaster and yielded dangerously similar results. Some of the clays with plaster within them did not blister or blow out but the potential for self-destruction is nearly inevitable.

With the need to evolve the utility of form and function, the emergence of plastic altered our comprehension of efficiency. Once formed, most plastics are durable, pliable and water resistant. In their solid state, most plastics are non-biodegradable, but with a low melting temperature they can be recycled and reused. Similar to plaster, most plastics are created from a heated chemical reaction and hardened within a particular mold. Since most plastics melt around 220°F/105°C, the ceramic process proved far too intense for the plastic itself. Yet I found that small concentrated applications of heat would create some malleability to the form but not enough to create any object from. Although art is made from the use of plastics, the manipulation and creativity of its materiality is primarily limited to the product in which you choose to appropriate.

For industrial practicalities, steel has become a highly appropriate and valuable source of material. Being a strong, rigid and temperature resistant substance, steel has all the ideal qualities for structure and form. Yet steel is known to degrade and deteriorate its strength over time. Steel is a non-absorbent material but its exposure to water or other liquid elements may create a corrosive environment for the iron in the material to be pulled to the surface and weaken its structural integrity. When measuring steels melting point of 2600°F/1425°C, we perceive its temperature not constant, uninterrupted heat. When steel was placed into the kiln environment and fired to approximately 2350°F/1288°C, none of the steel lasted the process but instead melted away from the clay and eroded all the way down to the shelves. After my tests, I found steel had more strength and structural stability than clay which is mostly a fragile material.

Its malleability was equivalent but only if you have the right tools or thinner variations of its substance. Its longevity is realistically a blink in comparison to clay which never actually degrades over any period of time and my heat index information found the materials to be less resistant than speculated. Overall, the materiality has its uses but its diversity is quite limited.

Conclusion

As a result of all my studies, I would feel quite comfortable stating that the diversity of clay as a material is superior to any other that is currently in use today. I have dissected the properties of wood, paper, cardboard, plaster, plastics and metals in comparison to clay in order to reiterate the various functions that clay and ceramics presents (See table above). Even with the breakable factor of its finished product, the material will remain unaltered in its shattered state for thousands of years. Its earthly composition does not require any form of molecular alterations or synthetics. Most of the earth is made up of its primary ingredients therefore making it the most abundant material on the planet.

	Physical Malleabl e	Assisted Malleabl e	Strengt h	Heat Resis t	Degree of Melting	Longevit y	Water Absorb	Permanen t	Tot al
Clay/ Ceramic	5	5	1	5	4	5	5	5	35
Plaster	3	3	3	1	1	2	5	2	20
Steel	2	4	5	3	5	3	1	3	26
Paper/ Cardboard	3	2	1	1	2	1	3	1	14
Plastic	1	4	4	1	3	4	1	3	21
Wood	1	3	4	2	3	2	3	2	20