Brick Color Selection and Specification

Clayford T. Grimm, P.E.[1]

Color specification for brick masonry is a continuing problem for both manufacturer and purchaser. There are 180 clay brick manufacturing plants in the US. One manufacturer markets 147 named color blends, each of which may be seen on the web. There are at least nine manufacturers of mortar colors, one of whom markets 64 named pigments. That is 11,136 color combinations from just two manufacturers.

Samples submitted to at least one brick manufacturer for matching have included "paint chips, cloth swatches, various sizes and textures of colored paper, pieces of porcelain enamel, and glazed tile chips."

Verbal descriptions of colors to be matched by the same manufacturer have included: "a dark blue with reddish cast," "a light pinkish orange, like X brand lipstick," and "a dark gray with brown spots like match heads" (Identification...,1962). It has for many years been evident to architects and builders that a universal color system is necessary. Although no such system is in general use in the US brick industry today, it is probable that the brick industry will one day adopt a color coordination system now used in other industries.

There are three ways in which color can be identified: by verbal description, by comparison with a sample, or by numerical results of color measurement. Vagaries of language lack precision required for refined architectural tastes. "French nude" may be suggestive, but it is not descriptive. Comparison of masonry in place with a previously approved sample panel built at the job site is the current method of color acceptance for brick. While clay is being dug from earth, ground, mixed, formed, burned, selected, packaged, delivered, and installed everyone prays, but no one really knows until the "observing" architect says, "Well, I guess... that's OK." or perhaps, "Tear it down." Color spectrophotometric measurements are costly and provide greater precision than is necessary for architectural purposes. And yet there is a current need for more precision in color communications in architecture where acceptance should not be "in the hands of the gods" or capricious whim of mortals.

The Munsell method of color notation (www.munsell.com), now in use in many industries and professions, describes color in terms of hue, lightness, and saturation. These three attributes are arranged in orderly scales of equal visual separation so that each becomes a dimension in a spacial representation of color. Under American Society for Testing and Materials (ASTM) standard conditions of illumination and viewing, these scales serve as an accurate instrument for color measurement of all surface-reflecting objects.

Each page in the Munsell Book of Color (Munsell..., 1967) is devoted to one of 40 hues with colors arranged from dark to light vertically and gray to saturated horizontally in chips carefully printed to very narrow color tolerances. The Munsell System can classify any color sample according to ASTM D l535-96 Specifying Color. A monochrome brick color may be specified as one of 1,270 color chips in the Munsell Book of Color with matte finishes. A book of glossy colors is also available. Thus, a simple and direct means of color notation has been established.

DESCRIPTION

Existence of a highly usable color notation system does not obviate need for standard terminology. ASTM has issued a multitude of standards relating to color, color fastness, and colorimetric analysis. Inter-industry, intra-industry, and professional communications concerning color are important to economic as well as aesthetic progress. The Inter-Society Color Council (www.iscc.org) in cooperation with the National Institute for Standards and Technology of the US Department of Commerce has prepared a method for designating colors and a Color Dictionary (Kelly and Judd, 1965). A standard nomenclature system has been superimposed on the Munsell notation system. The results are names accurate enough to satisfy scientist, usable enough for professional and industrialist, and simple enough to be understood by consumers.

In the Color Dictionary Munsell notation is divided into 267 blocks, each contains about the same range of color. To each block is assigned a number and a simple color name, consisting of a hue name and one or more modifiers, such as "dark red" or "light yellowish brown." The Munsell color notation was determined for a great number of colors in use in several industries. Names applied to these colors were then given as synonyms for the dictionary color name. The dictionary contains 17,400 entries. Thus, "French nude" is found to be "moderate yellowish pink" for which color there are 120 synonyms, including "rose nude, nude tan, flesh

[1] Clayford T Grimm, P.E. is a consulting architectural engineer in Austin, Texas and an Honorary Member of The Masonry Society.

pink, blush, Cupid pink, flesh blond, powder pink," and, ...you guess it,... "baby pink." The purpose of the Color Dictionary is not to abolish such suggestive terminology but rather to provide some basis for meaningful color communication.

In June of 1970 the American Institute of Architects endorsed the Color Dictionary and encouraged its use by practitioners, manufacturers and others in the construction industry.

In October 1970, the Southwest Section of the American Ceramic Society recommended that ASTM consider revision of face brick specifications to provide for scientific color specification with appropriate tolerances. That was not done because a few reactionaries on an ASTM committee find it easy to inhibit progress.

PSYCHOLOGY

Having a system for identifying and describing colors of brick leads one to question which color should be used where. Most writing on color in architecture is replete with introspective subjectivism. "That word aesthetics is a license that allows for some of the loosest talking and writing men do." (Bennett, 1956) However, Kuller (1981) provides an annotated bibliography of some 268 scientific papers, which provide some basis for making rational decisions about the color of structures.

Osgood and his associates (1967) found that most of the connotative meaning of ideas and objects can be measured by several polar adjective scales in each of three semantic dimensions of value, potency, and activity. Colors and structures to some degree connote value, strength, and action on a +3 to -3 scale. Most brick colors are thought of as neither good nor bad. Most are either slightly strong or weak and slightly active or passive. Reds, browns, oranges, and dark grays are strong. Pinks and yellows are weak. Pinks and grays are passive. Orange and light yellowish brown are active. The three semantic dimensions can be arranged orthogonally to create semantic space. The connotative meaning of some brick colors, textures, and sizes has been plotted in semantic space as have the semantic coordinates of ten building types (Brunham and Grimm, 1971 and 1973) (Grimm, 1975).

Thus, if your home is thought to be slightly active, very slightly week, and very good, it should hardly have colors that are thought of as being to some degree inactive, potent, and having low evaluative connotations. Is a prison a social rehabilitation center, a spartan human warehouse, or a place for punishment? The semantic differential does not define a building. It provides a means to express the intended meaning. Honest design requires that a building look like what it is. Architecture may be thought of as an iconic symbol system in which honesty requires that you say what you mean and mean what you say.

SPECIFICATION

If there is as yet little recognition of a basis for selection of one color over another, it is amazing to observe the very narrow tolerances within which color selections are made, and yet we have all been guilty of such nonsense in purchasing personal articles. It is the apparent nature of man to do what he can do only because he can do it, climb the highest mountain or buy a particular color of brick. Because so many colors of brick are available, designers are given opportunity to become very meticulous about having just the "right" shade, and some architects do so with great care and sometimes at considerable cost. Color sensitivity is directed primarily at hue. Much greater differences in both lightness and saturation are tolerated (Judd and Wyszecki, 1963, p. 307). However, slight deviations in the color of brick may not amount to failure to comply with a contract (Kornblut, 1976).

Considering the almost universal nature of such whimsy, it seems desirable to have some pre-established criteria for brick color acceptability. For that purpose, a brick surface may be classified as monochrome or polychrome. Multicolored units may be spotted, mottled or blocked.

The number of possible permutations and combinations of spots, mottles and blocks of various shapes, colors, sizes and contrasts viewed at varying distances preclude a workable written description for polychrome brick. Seller will have to satisfy buyer by whatever ethical means are available or lose the sale, and no amount of prior written agreement will make much difference. However, some control can be exerted by specifying the body color of a brick having a multicolored face. This is particularly appropriate for spotted brick.

However, it is entirely feasible to write a simple specification, which stipulates color tolerances for the surface of monochrome brick and for mingles or blends of various colored brick. The simplest method is to specify the Color Dictionary name and number desired (Kelly and Judd, 1965). In most cases, this should permit a sufficiently narrow description to meet architectural aesthetic need for acceptable brick color. This would give the manufacturer an approximation of the color required, e.g., light brownish gray is acceptable and grayish brown is not acceptable. However, once a brick of given color arrives at the job much more narrow color tolerances are applicable.

Closer tolerances can be attained by specifying the Munsell hue, value and chrome together with an allowable color tolerances in units of just noticeable difference (jnd). Equations for computing jnd are in the literature (Judd and

Table 1. Suggested Color Tolerances for Monochrome Brick Surfaces

Color Difference Between Specified Value and Brick Specimen	Color Tolerance, jnd (jnd = just noticeable difference)	
	Residential	Architectural
Average of ten specimens sampled at job site	14	7
Any two points within 0.98 ft (300 mm)	4	2
Any two points on the same structure visible from a third point	8	4

Wyszscki 1963, p. 293). Table 1 provides suggested color tolerances for brick (Grimm, 1975)

RESEARCH NEEDS

Further research in this area seems justified on the basis of anecdotal evidence on the number of complaints about matching brick colors. However, if salesmen would prefer to solve such problems on the golf course, no further research is necessary. Otherwise, much more aesthetic research is needed on masonry color, texture, and size of units. Extent of such research will depend on the usefulness of results as they are made available.

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