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The influence of "fads" on design

When one hears talk of fads or something that is faddish, one generally thinks of such things as clothing styles, music, various art forms, or the like. And if such philosophically debatable aspects as the social impact of music, art, or clothing are overlooked for simplicity, fads in these areas can be considered harmless and not detrimental to the social welfare.

When fads leave the arts and enter the sciences, however, they can be generally detrimental to the social welfare for the simple reason that reliance upon a fad as the status quo or state of the art will inevitably hamper progress toward better solutions to scientific problems. Scientific practitioners lean toward the comfortable position of sharpening their skills on the current fad in preference to the less comfortable posture of seeking better solutions. The latter situation is sometimes considered as a socially undesirable position of "opposing the trend."

Are engineering fads common?

To develop the hypothesis, consider first the question: Are fads the common mode or state in engineering practice? The rhetorical answer is *yes*, with a few simple examples to justify it.

A combination of marketplace forces have built faddism into engineered products, whether they be consumer products or less visible products such as production tools and structural shapes.

Probably the most obvious consumer product is the automobile. Engineered designs in the United States followed very distinct fads, commencing, say, in the mid 1940s. Looking back, we see a progression of fads from lower to longer to wider to more chrome to higher horsepower. In this progression, virtually all engineering talent was directed at satisfying the then-current fad.

Less evident to the general public, but certainly known to practitioners in the building business, (both those in the technical end and those in the financial end) is the faddism in architecture. Perhaps because of the relationship between the disciplines of art and architecture, it can be understood how the susceptibility to fads spills over. From the standpoint of financial stability, architectural fads can be either an asset or a liability. A short-lived fad that quickly "ages" a building can be disastrous to the investor, whereas a long-lived fad can stabilize the investment.

Turning to a less visible component of the building, the mechanical system or the environmental system, fads have been most prevalent. In the late 1940s, hot water radiant panel heating systems were faddish. They were dutifully applied and misapplied by designers of systems for office buildings, schools, churches, homes, and virtually every other conceivable type of building. Rather than recognizing that the major problem with these systems in their areas of misapplication was one of thermal mass creating a system time constant that could not possibly respond to load changes, major control manufacturers encouraged their continued use and attempted to solve the problem by sophisticated anticipatory load controls.

As the building fads turned rapidly from double-loaded corridor shapes to cubical shapes with sealed fenestration, the need for total environmental control arose. The attendant need for multiple zones of control combined with architectural pressures for "volumetric efficiency" and the coincidence of

inexpensive energy brought about the fad of the high-velocity double duct system. This has been the most successful and long-lived fad since the steam radiator. Even in the days of "cheap" energy, if thorough system analyses had been done, a major percentage of the high-velocity double duct systems could not have been economically justified.

What forces motivate faddism?

Before discussing current fads, a second question should be addressed: What force or forces in society motivate the engineering community in the direction of faddism? The answer to this question is not simple since there are many interacting forces at play. A simple statement of the major contributions might be:

- *Economics of mass production.* From the standpoint of the manufacturer, mass production is the name of the game in cost reduction. Cost reduction gains the favorable position in the marketplace. And mass production requires large volumes of items in standard shapes and sizes. Thus, the manufacturer who tools up to produce a product (say a high-velocity double duct mixing box) must promote a market to assure a volume sufficient to control the price that the promoted market can endure.
- *Economics of risk.* Once a market is assured (i.e., the fad is established), the safest venture on the part of any manufacturer is to provide a product that is usable within the established market. This is the "sure thing" approach. The example stated above of the control manufacturers who developed products to improve the performance of misapplied radiant panel systems is but one of many such examples.
- *Economics of cascading opportunity.* This is the catalyst that generally motivates success in both of the above cases. In the vast majority of situations, particularly in the building systems industry, the conceptual "system" required products of several different component type manufacturers. As an example, with the high-velocity double duct system, the mixing box was only one small component. Along with it was needed large, high pressure (Class III) fan equipment, high-pressure duct apparatus, special vibration dampening devices, and acoustic attenuators in the duct systems. Each of these devices opened a gate to another group of product manufacturers, all of whom subsequently supported the concept! This cascading opportunity phenomenon carried on in many cases to the energy supplier who sold the energy to motivate the system. In numerous fad examples, the energy supplier became both the prime beneficiary and the prime promoter of the fad.

With the existence of fads in the engineering areas of building environmental systems recognized and the forces causing these identified, we might now address current fads. If the multitude of current fads could be expressed in one word, it would be *energy*. Some rather evident, capsulated statements of these faddish systems and devices are: variable air volume, variable inlet vanes (fans), variable speed pumps, heat wheels and other heat recovery devices, central digital computerized control systems, and a host of other products to save energy.

Faddism is not the best solution

At the outset, it was stated that ". . . reliance upon a fad . . . will inevitably hamper progress toward better solutions to scientific problems." The development of this hypothesis endeavored to illustrate that the establishment of fads is necessary to assure some element of stability in the manufacturing of engineered products. But nowhere in the hypothesis is it stated that the best solution to any given engineering problem is provided by the reliance on or acceptance of a faddish product or system! Thus, if the consumer in the area of building environmental systems is to realize the best and most favorable economic and performance solution to his needs, it will not lie in fads but rather in both system and product engineering tailored to the needs of his specific situation.