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# Role of the Food Industry

## in Advanced Supermarket Design and Refrigeration

*Trends in Display; Refrigeration; In-Store Environment*

### *Food 70's*

Emphasizes commercial refrigeration manufacturers' role in establishing a total integrated in-store system of heating, air conditioning and humidity control for maximum shopper comfort and efficient operation of refrigeration equipment.

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● The 70's...A decade of great change.. Change is the key word. It has been said that "Opportunities will be magnified as to terrify the cautious and delight the adventurous" - The supermarket will find itself in the middle of these changes and there's nothing that reflects the direction of the economy, the mood of the consumer and the results of industrial innovation with more certainty than the American supermarket.

Although the supermarket is being affected by the forces of social, industrial and economical change; economics will be the prime force motivating the changes we will discuss today.

Diminishing profits tell us that we must hasten to search for new and better ways to improve efficiency in every phase and operation of the food business...from the moment food is acquired until it is out of the store and in the hands of the consumer.

Yet, while the need for efficiency will guide our pattern of innovation, the changing mood of the consumer must not be ignored. The problem of shrinking profits blends with consumerism...with all of its attitudinal and governmental ramifications...to create an exciting arena in which the chain store giants will vie for consumer attention and discover new ways to profit growth.

New methods of handling food will be needed to make labor more productive. This will spur the development of new food handling and distribution systems. In the store itself this will mean changes in positioning of perishable departments to accommodate new methods for moving products to the point of purchase.

Let's project ourselves into Supermarket/70 and review the trends in display that are quite apparent now... Realistic changes which we know will happen and can assist in making happen ourselves in the early seventies. Then we will glimpse changes of greater contrast which we expect may be on the scene at decade end.

In frozen food, the word for the 70's is multi-deck. The certainty behind this prediction is so great that it can't even really be considered a prediction. The industry's technological advancement in multi-tier low temperature case design has increased considerably in recent years. Improved air curtain technology has made it possible to deliver zero and sub-zero temperature to wide open merchandising areas and eliminates the early problems with ice and snow on the products. Three air curtains are used. The outer curtain is non-refrigerated and is a protective barrier against moisture-laden room air. Air is no longer discharged from the rear and

eliminates the problem of overloading the shelves and greatly increases merchandising flexibility.

Fronts on recent designs have been lowered considerably abolishing the "well" concept. We expect that they may go even lower to compare with the dairy case which has for years represented the ultimate in vertical merchandising.

With the improved refrigeration technology has come lower horsepower requirements adding greatly to the profits per foot in the frozen food department. Five-decks now cost less to operate than the original three-decks of ten years ago.

The dairy case has already achieved a high degree of display success. Not much is left to improve, but as we peer ahead at the dairy department, we see changes in product handling. Unitized shipping is being practiced to a small degree right now. The goal is to eliminate rehandling from the processing plant to the consumer's shopping cart. Perhaps the epitome of all dairy systems would be this:

We believe that the mobile shelf systems available today are a great step forward, but it is only when the total handling system is used, starting with automatic loading at the processing plant that the full labor saving benefits can be achieved. We expect the "kinks" will be worked out and these systems will become more commonplace in the near future.

In the produce department greater attention has been given to temperature control. Air is discharged from the top and gives the "heaped" displays better protection - island units are now refrigerated. At this meeting last year we heard of the advantages of temperature control to meet specific product's temperature; 32° for lettuce-45° for peppers. If the display case is held at 35° - 38° ; while helping some products, we may be harming others. Although it may be possible to provide display units with two or more temperature zones in the same case, the pulsating from the food industry at the present time tells us that this is an unnecessary step.

A keener interest in temperature control also prevails in the meat department where recent developments in zone type refrigeration have given the meat department a brand new look. Merchandising opportunities have been

broadened because the refrigerated area has not been limited to a flat 30" wide display deck. Manufacturers are also providing the means for implementing improved meat handling systems. These innovations are excellent preparation for the day when the display cases will be the merchandising end of a total system which has at its beginning a central processing plant.

The topic of zone refrigeration leads us to ideas that may become real further into the seventies. The division between comfortable shopping areas and controlled temperature zones may be no broader than a shopping cart wheel. Perhaps, the case concept, with its fixed dimensions and other merchandising restrictions, will disappear: So that in this refrigerated zone you will be able to apply any type of merchandising device which has in its basic design the elements of efficient handling and dramatic merchandising. The sales life of produce will be extended beyond what is now possible through better temperature control throughout the entire handling procedure. Consider this concept of mass-merchandising: A complete refrigerated zone filled with produce, decorated to resemble a cornucopia, with several refrigerated zones which give the air of an old-time outdoor farmers' market.

"Containerization: is a magic word in produce distribution systems of today. Applying the principle of containerization to the produce industry would reveal a scene like this: The container would be filled with produce items at the point of picking, shipped to another section of the country through the air, piggy-back or over the road. In each case, the wheels of the container are detached and applied where necessary for mobility. The container, for example, could be delivered to the supermarket and attached with an air-sealed gasket to the side of the supermarket and at this point serves as the storage area from which the out-front display was served. If we were to use a zonal type system for produce, many of the produce items could be display-ready and wheeled into position for the consumer to buy.

If we are to carry the zones concept to the frozen section, your department may look like this: These drawings are furnished by Hill Refrigeration and are used by Neilson and Progressive Grocer in their store of the seventies presentation. Since frozens will play a more predominant role in the supermarket that will become the hub of the sales

activities and a rotary display could be created, this unit will have to be supplied from a lower level. Wall type presentation may look like this and in the refrigerated zone, a display could be wheeled into position where they have been stocked at some central location. The use of new stocking techniques, wherein polyethylene bags will be given greater attention, make it conceivable that the peg-hook concept, so successful in deli, may be applied in the frozen food section.

We'd like to shift gears right here and talk about a subject on the lips of everyone in the industry -- environmental control. Why is this so discussed today when five years ago no one wanted to talk about it? Why, also, is it one of the most misunderstood concepts of the supermarket of the seventies?

In 1955, the average supermarket utilized 30 HP of refrigerated equipment to display perishables...and the majority of this equipment was single-deck. Since then, we have witnessed the growth of multi-tier merchandising equipment. The wide open area of multi-deck equipment involves a continual process of removing heat across the openings. Harking back to our schoolbook definition -- refrigeration is the removal of heat, not the introduction of cold. Thus, today, we find that the additional HP to run multi-deck equipment, plus the increases in the size of stores over all, results in 100 HP of refrigeration on the average. This means three to four times more heat is being extracted -- literally refrigerating the store.

Now let's turn our attention to the primary controller to the environment in the supermarket -- the heating and air conditioning system.

When the system is on cooling cycle, the cold air falls to floor level forcing warm air up and into the return air duct as shown here...perhaps the most ideal situation imaginable.

But when the store switches to the heating cycle, look what happens to the warm air -- it never really gets to the floor. Some of it sweeps right back into the return air duct. Some might get down as close as seven feet to the floor. The only way to get warm air to the floor is to use extremely high velocities which simply can't be done.

Thus, the traditional environmental control system used in the supermarket

industry since its inception already results in stratified air and cold temperatures at floor level, even before we introduced refrigerated equipment. In 1955, this equipment would not make a significant contribution to the problem.

Today, the introduction of multi-tier merchandising equipment and the extra HP it entails bring about cold, cold aisles -- because of this extra HP removes even more of the heat at floor level...and this warm air at the top never gets a chance to alleviate the situation, the way it should.

During the cooling season, the situation gets even worse. The air conditioner, sensing the cold at aisle level, decides that it doesn't have to work. The multi-deck cases are left to perform the function of the air conditioner. But in the summer months an invisible danger lurks in the aisles of the supermarket -- humidity.

Humidity can be as much an enemy to your profit dollars as bacteria in destroying perishable products.

When the air conditioner decides not to run, humidity builds up in the store and is removed by the cases through the coils causing them to operate inefficiently and thus costing more money to operate. Air conditioners can remove humidity at half the cost of cases.

There are solutions to these problems and Henri Langlois was one of the early advocates of a system to control the supermarket environment.

The remedies for these situations are not as complex as one might think. Take the cold aisle situation. For instance. Here, in the heating season, the use of floor returns, strategically located near the open, multi-deck equipment, draws the warm air from the top of the store down to aisle level creating a comfortable shopping situation throughout the store. However, in the cooling season, when the air conditioner is not running, we still have the cold aisle problem... plus, humidity. We can solve these problems by introducing a secondary heating source in the air handling system...downstream from the air conditioning coil. This secondary heat source "reheats" the cool air and warm air is drawn down to aisle level. The air conditioning coil, in the meantime, is doing its job of removing humidity from the air.

This results in comfortably warm aisles, particularly in the area of multi-tier cases, and a humidity level that allows proper case operation at minimum operating cost.

An inexpensive source of heat to accomplish this environmental control function is the heat extracted by the refrigerated cases in the store. This heat, traditionally has been gathered from the cases through the condensing unit and thrown away into the atmosphere.

Today, in the seventies, we recommend that this heat be diverted to a secondary coil in the air handling system. In the heating season, this becomes a "free" source of heat to supplement your conventional heating system, affecting savings in initial cost of heating equipment, as well as fuel savings.

In the cooling season, heat reclaim provides a sure, safe way to control humidity and rid your store of this invisible enemy. This type of environmental control relies heavily on the type of condensing unit system employed.

Again, supermarkets traditionally have relied on many single compressors operating line-ups of equipment independently of each other. None of these can adequately perform the environmental control function alone.

Just as we must adjust our concept of the supermarket air handling system to introduce floor returns, so also must we realize the need for new compressor systems in the supermarket of the seventies.

Ultimately, commercial refrigeration manufacturers will make available application engineering for complete environmental control within a supermarket...utilizing solid-state, environmental control panels to provide for total integration of heating, air conditioning and humidity control for maximum shopper comfort and efficient operation of refrigeration equipment. ●