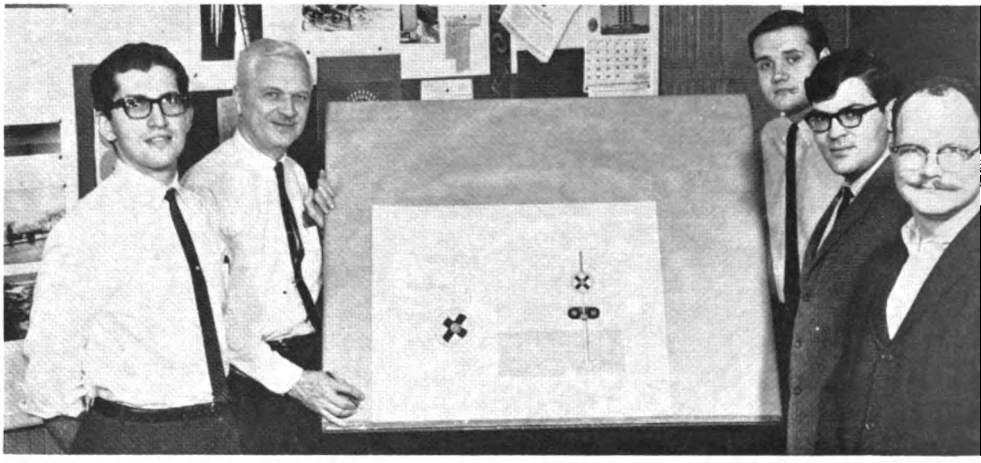
Crossing protection gets a new look



Industrial design students create a new look for crossing protection equipment. Robert Fields (left) next to Joseph Palma, professor of industrial design, flank one of the new designs. Other students (left to right) are Andrew Kainass, Richard Scafidi and Fred Hirsch.

Five senior students of industrial design from Chicago's Art Institute have stormed a bastion of railway standardization, namely railroad-highway grade crossing protection equipment. "They won a moral victory," commented one railroad's signal engineer, after viewing their designs. "Their efforts at creating new designs for crossing protection equipment are very fruitful and worthwhile," he added.

It all began about three months ago when Joseph Palma, a professional industrial designer as well as professor of industrial design at the School of the Art Institute of Chicago, gave five senior students an assignment in industrial design. The assignment, according to Mr. Palma, was to provide instructive and practical results. For example, the assignment should provide realistic interaction between designers and engineers in industry. Another objective would be to give the students a "hard nut to crack." This nut, said Mr. Palma, was to be something functional, yet with restrictions that would make the design problem difficult. As an example of an easy subject, Mr. Palma mentioned a portable radio. The only severe restriction would be a minimum size requirement. Thus he was looking for something

with a real challenge. And he found it.

A resident of Wheaton, Ill., Mr. Palma is a Chicago & North Western commuter. He noticed that the crossing protection equipment he passed daily on his trips to Chicago looked "pretty much alike." Such standardization, he noted, certainly would present the type of restrictions that would create an interesting design problem.

C & NW ENGINEERS HELP

Accordingly, he contacted C & NW's vice-president and chief engineer, B. R. Meyers, who in turn, made arrangements for Mr. Palma and his five students to meet V. S. Mitchell, signal engineer, and E. W. Horning, crossing protection engineer. This meeting, Mr. Palma said, was not so much concerned with design suggestions, but to provide background information to his group about highway-grade crossing protection. For example, drawings of equipment and the AAR's standards were furnished to the design group so that they would know what restrictions and standards were to be met.

The general approach of the designers was to work out concepts that are psychologically correct, yet can be produced within a practical cost range. The designs must be functional as well as pleasing to the eye. It's more than just coming up with an attractive design.

With the standards and restricions in mind, the five industrial design seniors—Thomas Anderson, Robert Fields, Fred Hirsch, Andrew Kainass and Richard Scafidi—went to work. After completing their designs, they exhibited them to the C & NW engineers and other signal engineers in the Chicago area. Other interested persons who have seen the designs include representatives of manufacturers of highway grade crossing protection equipment.

Response was enthusiastic and generally favorable. A brief survey of the opinions of those viewing the designs indicates that however much there is support for these designs, there is also the realization that it may take considerable effort and time for them to be accepted and put into use. "It is a good beginning, and long overdue," remarked one observer. He said that there has not been a material change in 30 years in crossing protection design. While some of his fellow signal engineers would not be quite so critical, another man was heard to state: "It's time we got some of the garbage off the signs. Most motorists approach crossings too fast to read the signs, and if they are stopped they don't bother to read them anyway. I think you'll find most people know that the crossbuck means railroad crossing and the flashing red lights mean stop."

NEW LOOK IS GOOD

"It's certainly a good idea to have an outside opinion on these matters," commented another signal engineer. He went on to add that these designs will start people thinking along the lines that some improvement can be made in existing equipment.

A sampling of the designs of each of the five senior industrial design students follows.

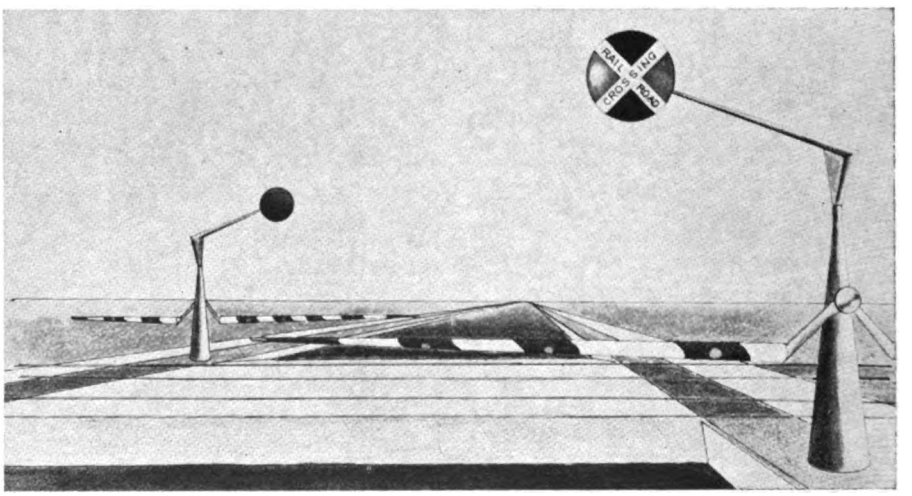
Crossbuck and approach sign are basic units.

Fred Hirsch has, as he put it, worked with the basic crossing sign," that is familiar to most motorists. In this concept, the conventional crossbuck would be retained, but with a different background. The two segments between the crossbuck, vertically one above the other, would be flat black. The other two segments, in a horizontal plane, would contain red fresnel lens to present a flashing red light to approaching motorists. Flashing would be produced by solid-state circuitry using a flip-flop.

The gate arms would be segmented so that if struck by a passing vehicle, they would break into pieces. Fastening would be in such a manner that any undamaged segments could be attached to remaining portion of the gate. New segments could likewise be attached to form a complete gate arm.

The particular approach to the problem, as Mr. Hirsch explains, is to use enough of the familiar signs and symbols so that the motorist will recognize them. Yet, the designer must incorporate enough of his own ingenuity so as to make the design attract attention. After all, one of the purposes of crossing equipment is to attract the attention of the motorist and cause him to heed the warning.

Mr. Hirsch's design has simplified the reading task of the motorist. And, in the words of one interested signal engineer, this design has eliminated the garbage from the signs. Only the simple wording "railroad crossing" remains. This, says Mr. Hirsch, is enough to attract and hold the attention of the motorist long enough for him to understand the message.



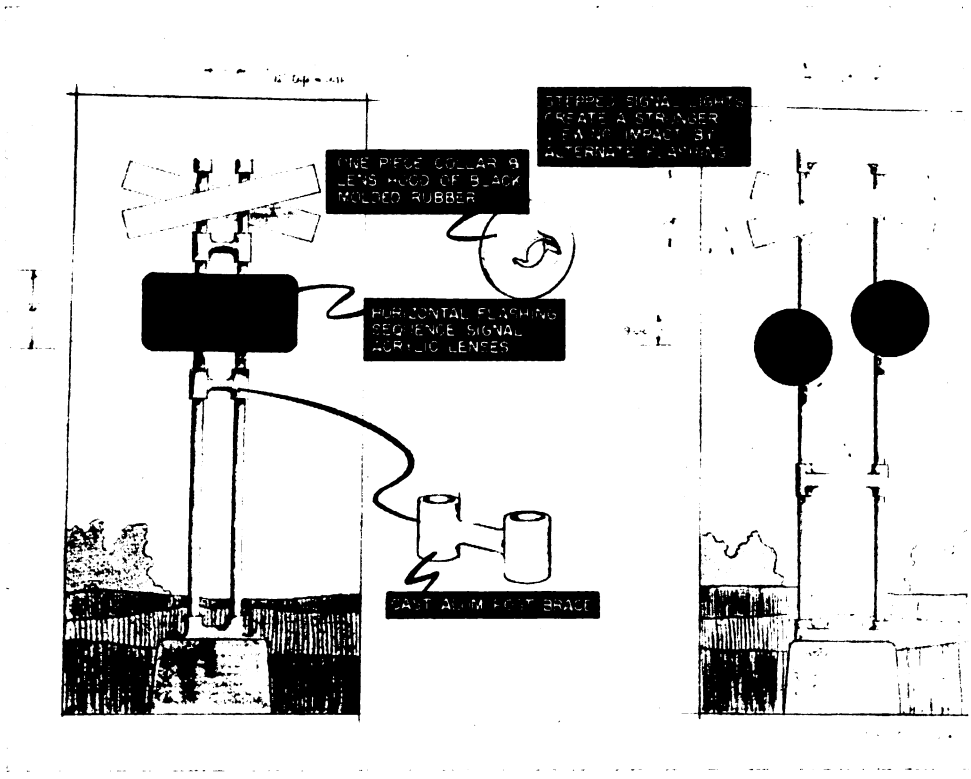
Conventional symbols are the basic units of Fred Hirsch's design concept.

Sequential flasher or Mars lamp may be effective.

One of the features of Robert Field's designs is the use of a white panelescent material for the crossbuck. This material, illuminated by a low-voltage lamp, will give the appearance of a white cross to an approaching motorist. Another feature of this panelescent material is that it will glow, so that the cross feature will be visible at dawn and dusk, when visibility is usually more difficult. To provide a more striking contrast, a black background can be placed behind the crossbuck.

In a variation of the conventional flashing-light units, Mr. Fields would stagger them. He explains why, this way: "Ever notice how a person upon seeing a picture hanging not quite straight almost always makes a motion to straighten it? I think the same might apply here. No one is going to try to align the units, but the staggered units will attract more attention than if they were mounted in line."

Another variation of the flashing-light units is to use a series of lights that flash in sequence in the direction of train movement.



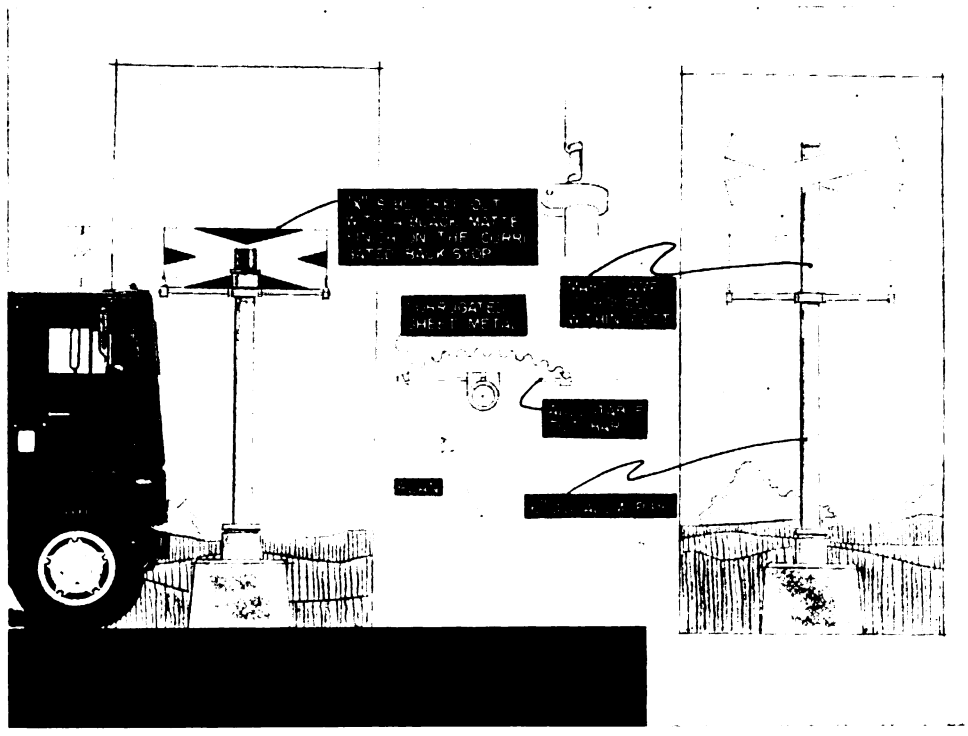
Sequential flashing or staggered lights may attract more attention.

MARS LIGHT EFFECTIVE

While retaining the crossbuck, a third variation presented by Mr. Fields, is to use a red Mars light to provide the visible warning signal. The Mars lamp unit could be mounted in front of the crossbuck, or in another version, the light is mounted in the mast. In this design, the Mars lamp itself would not be visible to the motorist, but the flashing red light would be visible. To provide focusing, a corrugated surfaced parabolic mirror or reflector would be mounted behind the lamp unit.

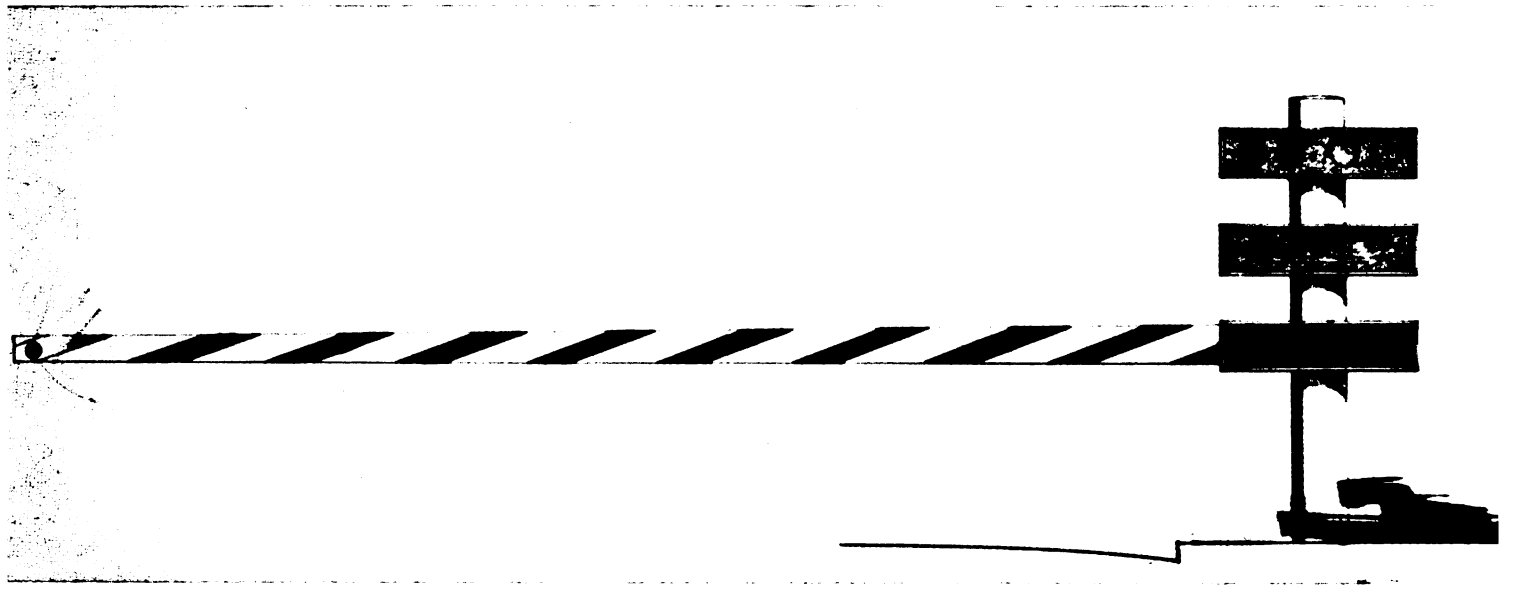
A feature of this design, which is characteristic of some of the others presented, is the use of molded plastic or rubber units to simplify manufacture. The thought is that such usage might well lend itself to mass production techniques resulting in lower costs.

Mr. Fields also subscribed to the theory of the less reading matter, the better for the vehicle driver. In fact, he has eliminated all signs or printed matter from his designs. Reliance is upon the motorist's familiarity with the shapes of signs and a red light to alert him to the situation. Here again, the effort has been to simplify the crossing protection equipment as far as visual impact is concerned.



Red Mars lamp is a feature of Robert Field's design for crossing protection.

One signal engineer said that these designs did not show any back lights. It was explained that it would be a simple matter to provide such lights on the other sides of the masts. The designs presented are preliminary, and other details could be added.



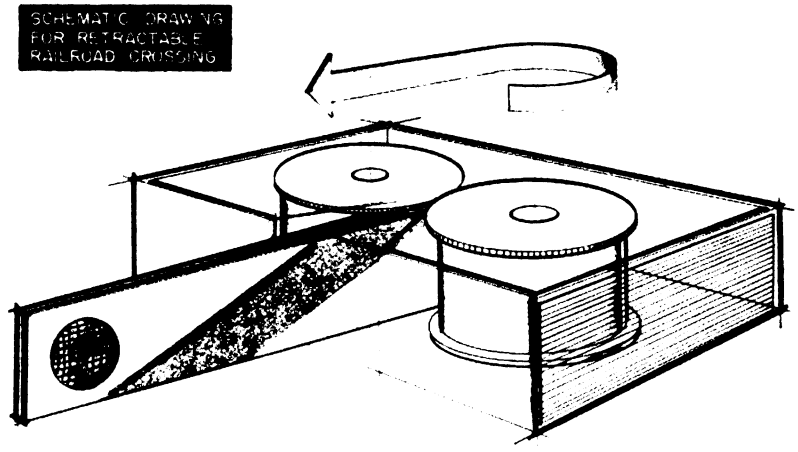
Lighted arrow would indicate direction of train movement in Thomas Anderson's highway crossing protection design.

Retractable gate would be of spring steel.

A low silhouette is one feature of Thomas Anderson's designs for railroad-highway grade crossing protection equipment. As seen in the photograph above, the flashing-light units and the train-direction arrows would be mounted just above the gate arm. This, explains the designer, would present a clean, neat appearance in residential neighborhoods, as well as at downtown crossings.

The lights in the top unit would be paired to flash alternately. The red arrow or arrows would illuminate to indicate the direction of train movement. Illumination of both arrows, of course, would indicate trains on two tracks moving toward the crossing. The arrow or arrows would be lighted at the same time the flashers begin operation, so that the motorists would know train direction before the gate was in position. The use of the train direction arrow would be helpful where the motorists' visibility is obscured by buildings, trees, shrubs or other natural or manmade objects.

One of the most notable departures from conventional practice is the use of spring steel for the gate arm. As indicated in the accompanying photograph, two strips of spring steel would be joined at one end. These strips would be wound around coils in the mechanism and would retract, much as a steel tape measure will upon pressing its retracting button. After a brief operation of the flashing-lights, upon approach of a train, the gate arm would be driven out of the case so it would project across the roadway. After the train passed, the arm would be retracted, the two steel strips being coiled up within the mechanism case. The strips would probably be convex or slightly bent to give them rigidity. By use of a heavier spring steel it might be possible to use only one strip for the gate arm, Mr. Anderson stated.



Crossing gate would consist of two pieces of retractable spring steel.

The gate arm would be painted or covered with reflective material to provide black and yellow striping. Experience has shown, according to visual design experts, that black and yellow striping has greater visibility than does black and white striping. Also included in this design is a reflective button or disc mounted at the end of the gate arm.

As stated earlier, this design follows the general principles of streamlinging or simplifying the warning units by eliminating excess words and signs.

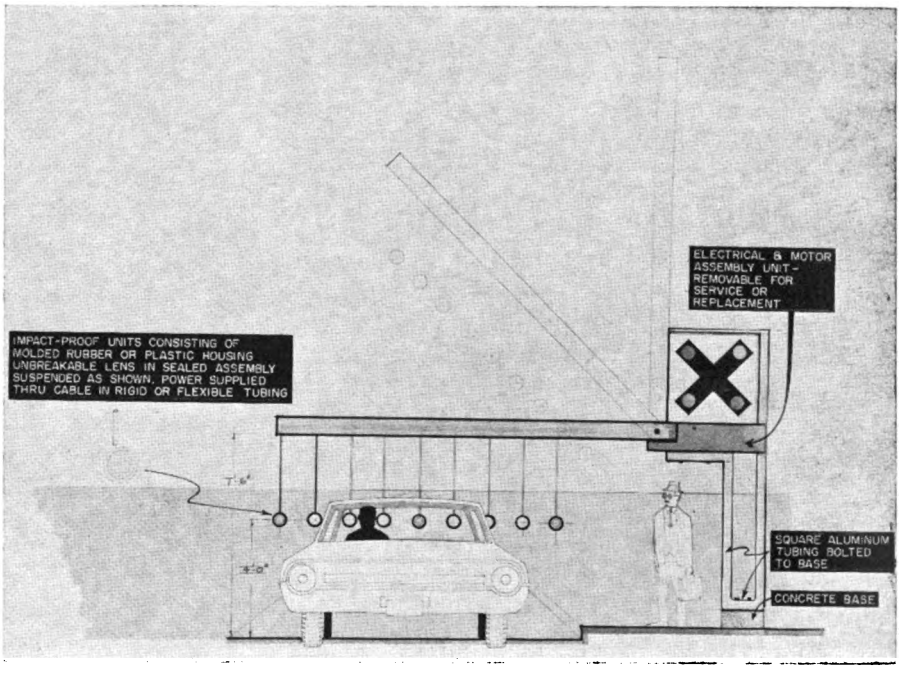
To prevent the arm from striking a vehicle, some type of light and photocell arrangement might be used to detect a vehicle in the path of the gate arm.

Unbreakable lamp form swing-away barrier.

Here is a design concept, commented a signal engineer, that uses the barrier approach so well known in Europe. He went on to say that this design has the advantages of barriers without the disadvantages. The designer, Andrew Kainess, says that his barrier lamp units are of molded rubber. They may be reflector units rather than lamps. They are hung on cables or flexible tubing suspended from an arm. The advantage is that if struck by a vehicle, the units will bounce or swing away.

When the arm is raised, a guiding wire or bar would operate in such a way so as to conceal the lights or reflectors behind the arm.

Mr. Kainass prefers to use three red light units interspersed with two groups of four yellow reflectors. However, it is not difficult to use all lights or all reflectors, or both in any combination.



Cable-held lamps would form barrier in Andrew Kainass' design concept.

BLACK CROSSBUCK

For a warning sign, he would use a black crossbuck with red light units at the ends of the cross. These could flash alternately with pairings as follows: two left lights then two right lights; or the lamps at the ends of one diagonal light simultaneously, then the lamps at the ends of the other diagonal flash simultaneously.

As in previous design concepts, there is an absence of signs. It was considered sufficient to use the barrier type of obstruction to impede traffic and flashing red lights to warn drivers of approaching trains.

To simplify maintenance, the motor assembly would be in a detachable housing that could be removed for servicing. Similarly, the lamp units hung from the cables could be easily removed or replaced.

In case any signal engineers raise objections about the "assumed" ease of simplicity of mechanical construction, it is fair to include the comments of Joseph Palma, professor of industrial design at the Art Institute of Chicago. He said these designs are only a beginning. All who participated understood that to come up with a complete working unit or even working drawings would require considerably more design effort and development.

Modular design includes lights and housings.

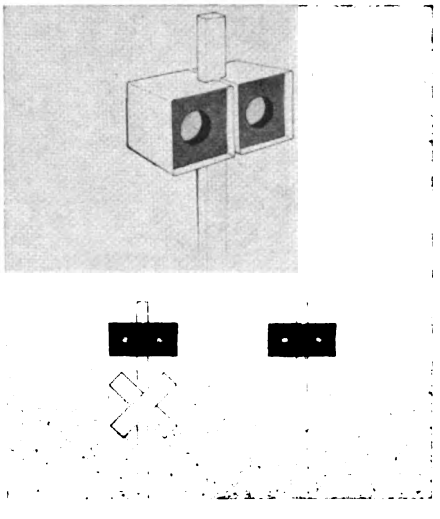
This particular design approach is that of modification of existing designs rather than a complete new treatment. Modular construction is the concept of Richard Scafidi. The main objective, he states, is to reduce manufacturing costs which can come about from mass production techniques. These can be applied because modular design can provide for large quantity production.

For example, the flashing-light units might be made of a cast metal, or a molded plastic. A feature of the molded plastic housings would be the elimination of any finishing process, as they would be made with a smooth finish.

The gate mechanism cases, relay and instrument housings could be of like size and proportions. If one modular case could not hold all the relays and control equipment, additional cases could be used. Fastening could be such as to locate cases adjacent to each other.

Mr. Scafidi would eliminate all signs, retaining only the crossbuck which could be with or without lettering.

One signal engineer, commenting upon modular design, said that such concepts have been used by European signal suppliers and railways. He suggested that such concepts might also be useful for crossing protection equipment. **RS&C**



Flashing lights would be modular in design proposed by Richard Scarfidi.