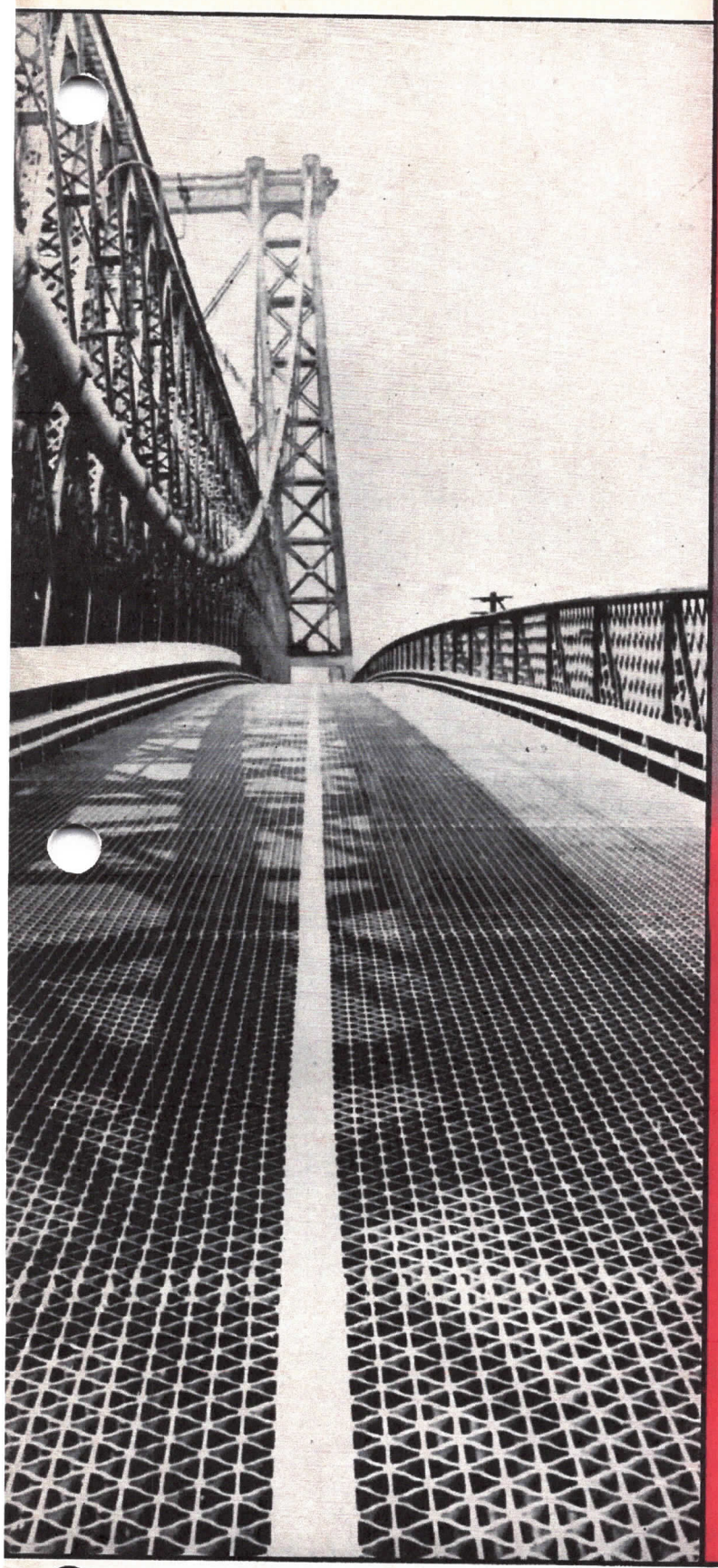


IRVING DECKING

THE OPEN STEEL MESH PAVEMENT

FOR BRIDGES

"A Bridge is only as Good as Its Deck"

IRVING DECKING

THE OPEN STEEL MESH PAVEMENT

for BRIDGES

Established 1902

IRVING SUBWAY GRATING CO., INC.

LONG ISLAND CITY 1, NEW YORK

WESTERN DIVISION

1819 Tenth St., Oakland 20, Calif.

British Licensees:
ESTLER-IRVING LTD.
3 CRANE DRIVE
SURBITON, SURREY, ENGLAND

Canadian Licensees:
CANADA INGOT IRON CO., LTD.
GUELPH, ONTARIO

CATALOGUE F-300

Lithographed in U.S.A.

CONTENTS

You Will Be Interested To Know—

IRVING DECKING, the Open Mesh Steel Pavement, is the most modern bridge roadway available. Nevertheless it has actually been in use since 1932 when it was installed on the University Bridge, Seattle, Washington, this being the first time in history that an open steel mesh flooring was used on any bridge. Since then, hundreds of bridges throughout the United States and Canada have been floored with this type of pavement.

Each installation of IRVING DECKING has been easily and inexpensively made. Economies have been effected through the elimination of maintenance expense. In the case of new bridges, there has been a saving in the cost of the structure due to the light weight of this decking. And its safety record is indeed enviable.

When one buys any IRVING GRATING PRODUCT — whether it be a small trench cover, decking for a bridge, or airfield mats for the U.S. Air Forces — he gets more than just grating. The customer purchases over fifty years experience, highest quality, unexcelled workmanship and service, satisfaction and friendly cooperation.

The fact that so many users of IRVING DECKING have sent us additional orders (one user having placed it on seven different bridges) is the best evidence we can offer of the satisfaction which IRVING DECKING is giving under actual service conditions.

We suggest you communicate with the officials responsible for the use of IRVING DECKING in various sections of the country. We also urge your inspection of the installation most convenient to you. We are confident that the information you will procure in this manner will be far more convincing than anything we may write as to its merits. For this reason we will be as brief as possible in this catalog, believing that you will write us should you be interested in obtaining additional information.

IRVING SUBWAY GRATING CO., INC.

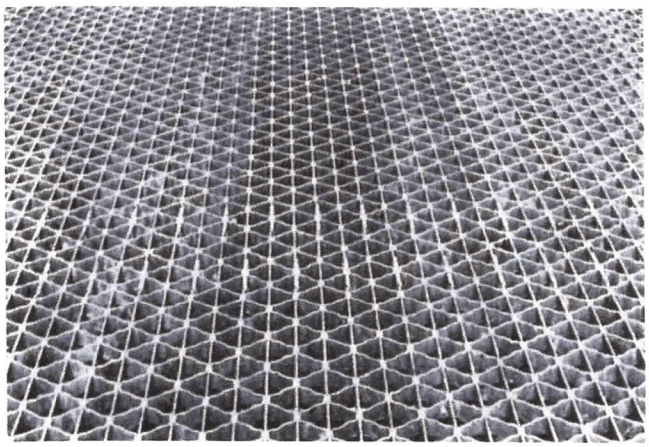
WHAT IS IRVING DECKING?

Irving Decking is the First Open Steel Mesh Roadway ever used on a Bridge or Bridge-like Structure.

It differs radically from previously used types of bridge roadway or pavement in that it is not a solid mass. It is open always—its meshes are not filled.

It is a grating-flooring consisting of alternate straight or carrying bars and "reticuline" or crimped bars on edge and fastened together at points of contact with all top edges of bars flush.

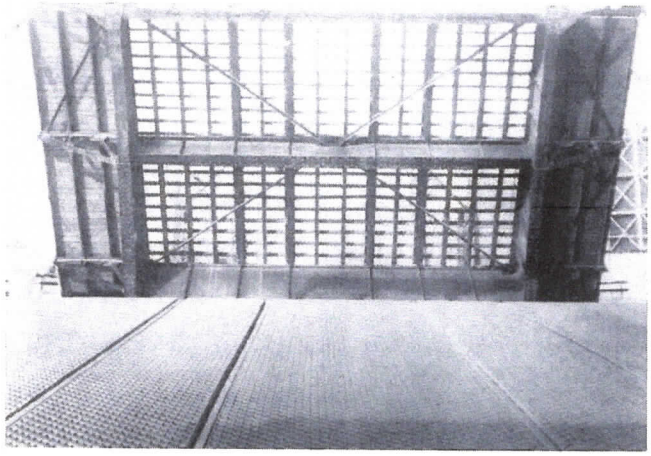
It is similar in appearance to the well-known



Irving Subway Grating, but of larger mesh and designed for an entirely different purpose, namely to provide a safe, lightweight, strong, durable and economical bridge roadway for vehicles equipped with pneumatic tires.

It embodies all the advantages found in other types of bridge floors, none of their disadvantages, and provides many features not found in any other type of bridge roadway.

The following are the principal features and advantages of Irving Decking:



Open, clean, all parts visible.

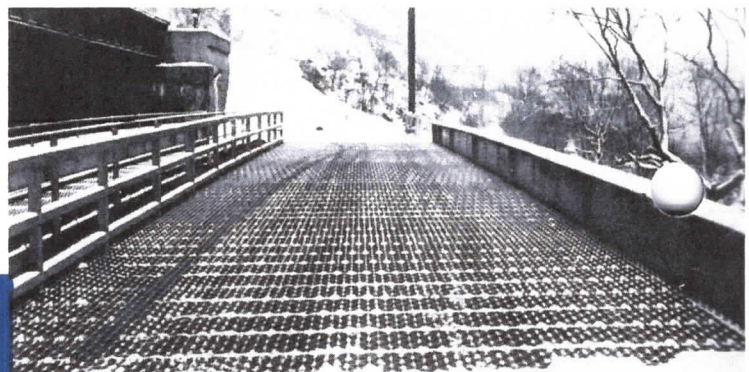
OPEN

Standard Irving Decking is 80% open. Its meshes or interstices are not filled with concrete, mastic or any other substance. It was originated and developed to be used open. It remains open at all times—regardless of weather conditions.

SELF-CLEANING

Irving Decking cannot accumulate snow, slush, grease, oil, dirt or mud. Its surface remains clean always without sweeping, washing, snow-shoveling or plowing. The reason is obvious—there is not enough surface to the top edges of bars on which these substances can remain.

Note below the snow free Irving Decking and the snow covered approaches.



SELF-DRAINING

Irving Decking cannot hold water any more than a strainer. A bridge roadway of this type needs no crown, camber, pitch or scuppers.

The rain falls through the meshes to all intents and purposes as though the bridge roadway wasn't there.

Simulating a heavy downpour before making a test of its non-skid qualities.

NON-SPLASH

Irving Decking eliminates puddles and the pedestrians on the narrow bridge-walkways are protected from the splashing which is so common on bridges with solid roadways.

NON-FLOAT

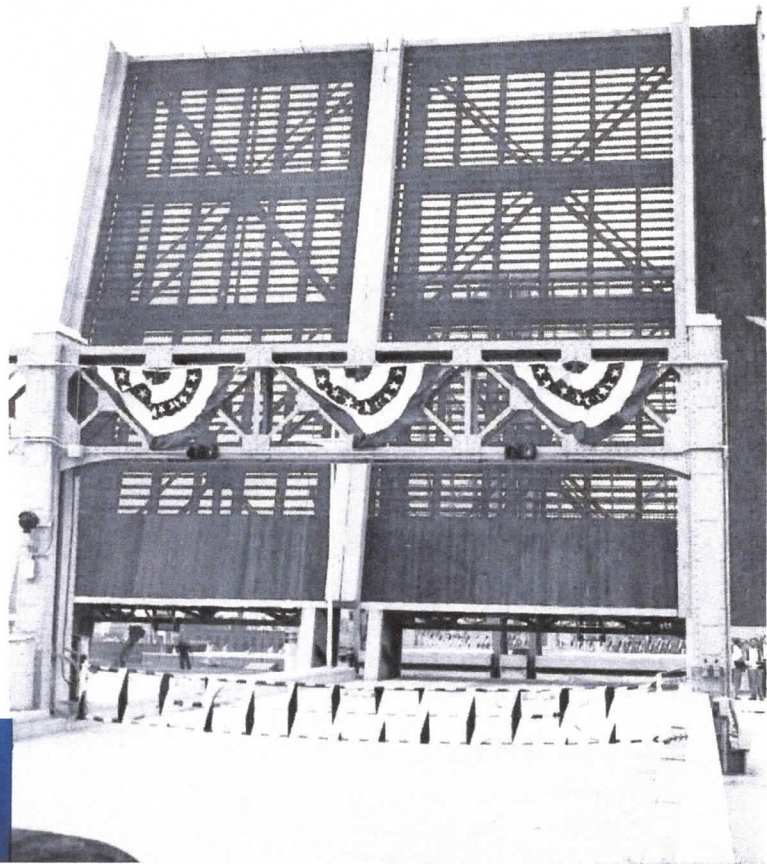
Irving Decking obviously will not float. Floods which would carry away certain types of solid decks, are impotent where Irving Decking is used.

Let the floods rise, I.D. will not float.

NOT AFFECTED BY WIND PRESSURE

Standard Irving Decking, being 80% open, offers minimum resistence to vertical air currents on long fixed spans as well as to horizontal air currents against upraised bascule leaves. It also facilitates raising and lowering movable spans during heavy winds.

The strongest winds are impotent against such a bascule leaf.



SAFE

Irving Decking provides the safest surface possible at all times and under all conditions.

Solid pavements are often not the pavement at all. They become merely the supporters of a pavement or a riding surface of snow, ice, sleet, oil, grease or water.

Irving Decking cannot accumulate skid inducing substances, consequently it remains always safe for traffic.

Snow-free Irving decked bridge. See next picture for bridge two blocks east, photographed same day.

The University Bridge, Seattle, Washington, averaged 182 accidents and 6 deaths annually while floored with a solid pavement. Since it was repaved with Irving Decking in 1932, skid accidents have been eliminated.

TRACTIVE

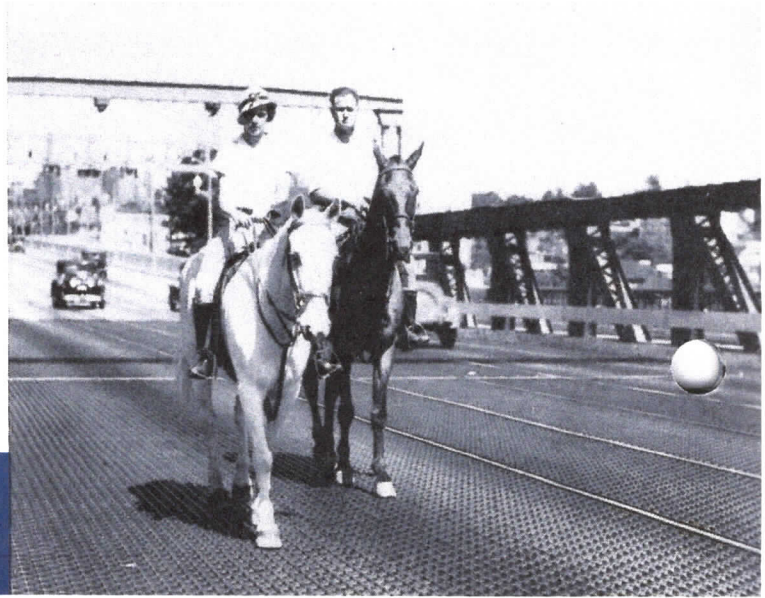
Irving Decking possesses a permanent inwrought element of traction which is not found in other types of bridge floor. Age or wear does not lessen this property.

This is the solidly floored bridge two blocks away from preceding picture.

Rubber tires of automobiles grip the upper edges of the steel bars to a depth of about one-eighth inch, thus insuring excellent traction at all times.

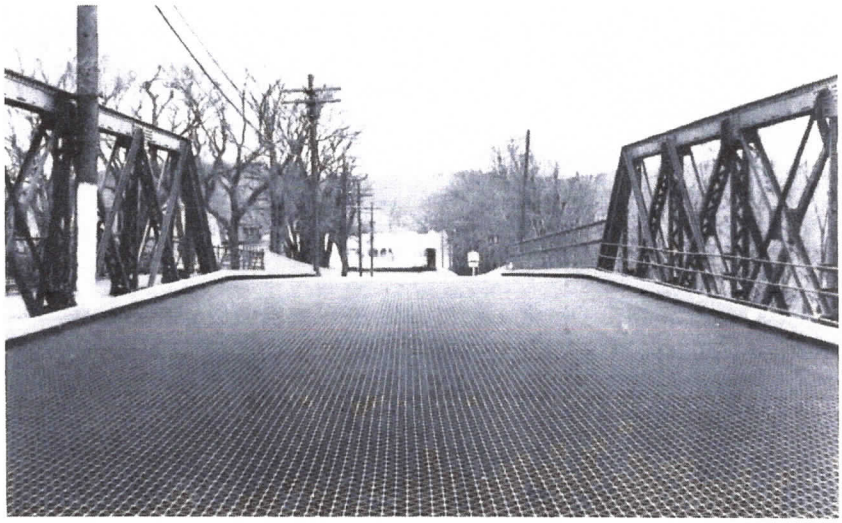
When brakes are applied to a car on Irving Decking, the straight bars act as rails and prevent side-skid. The specially designed crimped bars have a smoothly decelerating effect through a series of brake and yield reactions upon the tires, bringing the car to a stop in the shortest possible distance with the least possible abruptness, and without damage to tires.

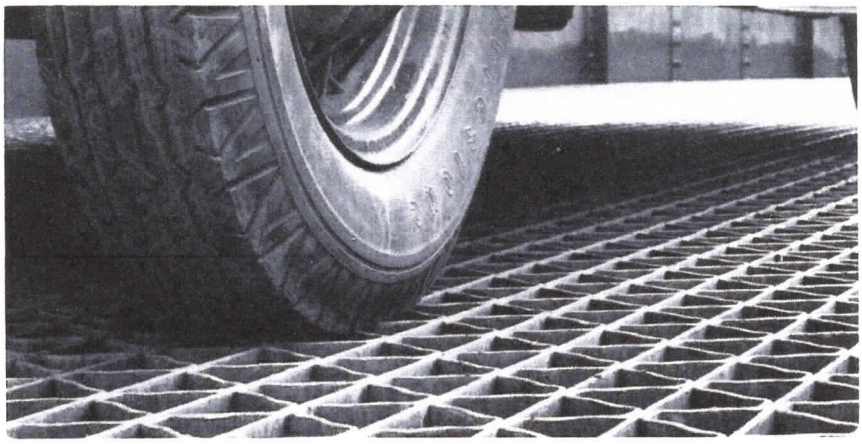
Horses and cattle cross Irving Decking without difficulty.



Right: A permanently even surface, minimizing impact and vibration.

Below: Tire grips upper edges of steel bars, assuring excellent traction.





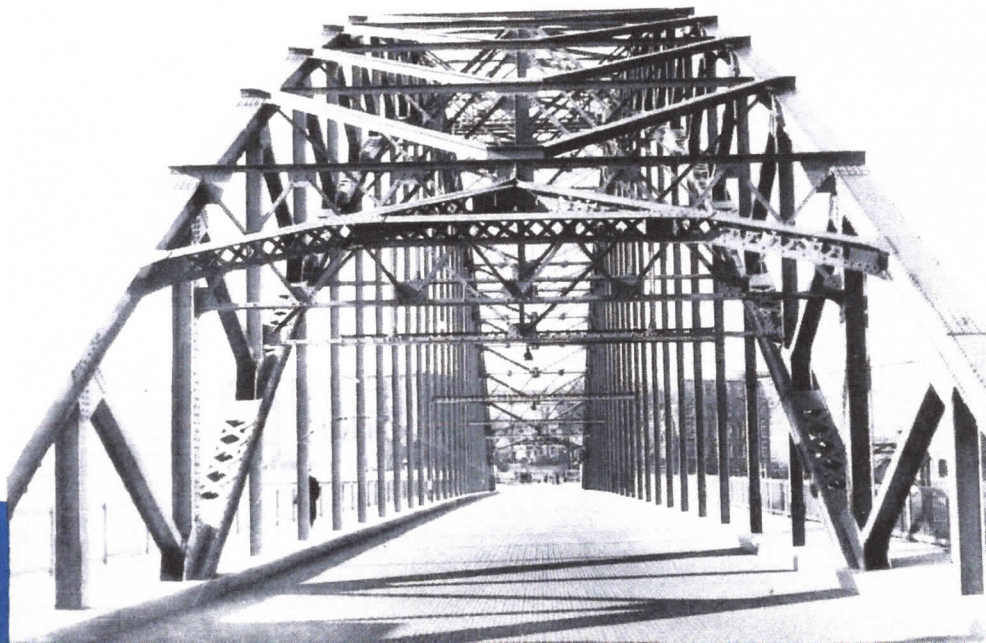
SMOOTH

Below: Smooth as a ball room floor but with better traction than rough dry granite blocks.

Irving Decking, while providing maximum traction, presents a surface that is as smooth as steel bars can be rolled by the mills. When the units of I.D. are laid in place and spliced together, the flooring becomes a one-piece continuous steel mat —regardless of length or width of the roadway area—free from joints or unevenness of any kind.

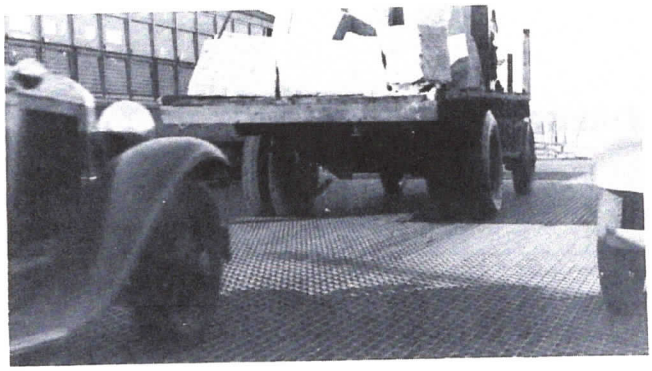
FREE FROM IMPACT AND VIBRATION

Irving Decking minimizes impact and vibration, so common with solid pavements, because it is permanently smooth. Absence of patches, repairs, cracks, joints, loose pieces, etc., in Irving Decking eliminates much wear and tear on bridges.

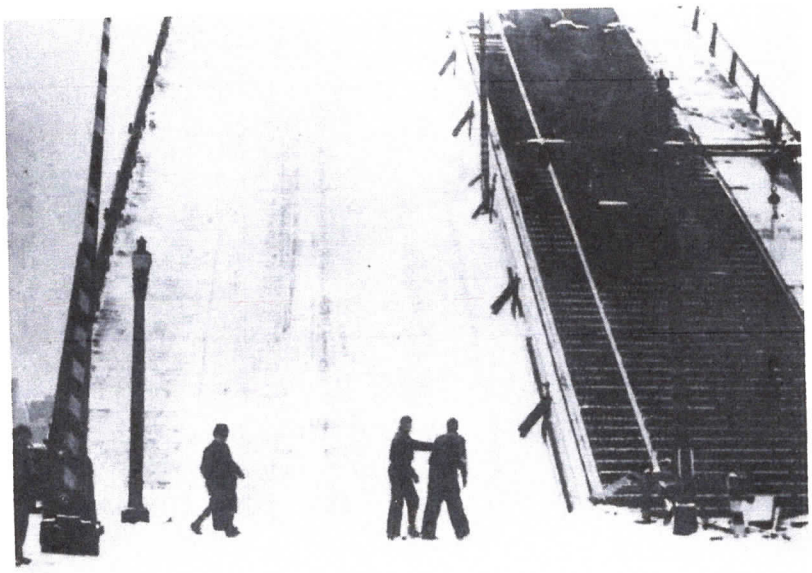


LIGHTWEIGHT

Irving Decking, because of its efficient design, is an extremely light weight floor. Standard Irving Decking weighs only 15¼ pounds per square foot, and since it will not collect snow, no provision need be made to take care of snow loads.



Irving Decking provides maximum strength with minimum weight.



Left half: Solid — and snow loaded.
Right half: Irving Decking — and snow free.

DURABLE— FIREPROOF

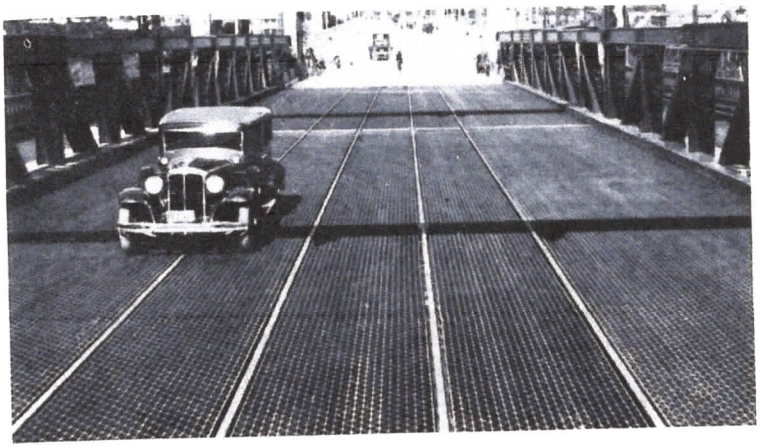
Irving Decking has the life of steel. It is the most indestructible flooring available and will last as long as the structure that supports it. Heat and frost have no ill effect on it. It has no concrete to crack; no asphalt or mastic to creep or flow; no wood blocks to bulge; no planks to splinter, shift, loosen, float or heave; and it never loses its traction quality as solid floors do.

STRONG

In addition to carrying the heaviest loading, Standard Irving Decking is designed to resist shuttering and overturning. The reticuline bars, being riveted tightly against the upper three-fifths of the main bars, furnish lateral support and brace the carrying bars.

(See Safeload Table page 18.)

University Bridge, Seattle, Washington—the first installation of open mesh steel pavement on any bridge in the world.

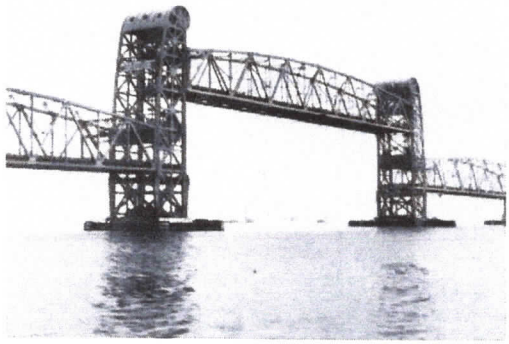


ECONOMICAL

Irving Decking is economical for the following reasons:

(1) It practically eliminates maintenance; and
(2) It minimizes dead load.

Bascule and Vertical Lift Bridges are made more economical by the use of Irving Decking through savings in towers, cables, sheaves, counterweights and lifting machinery.

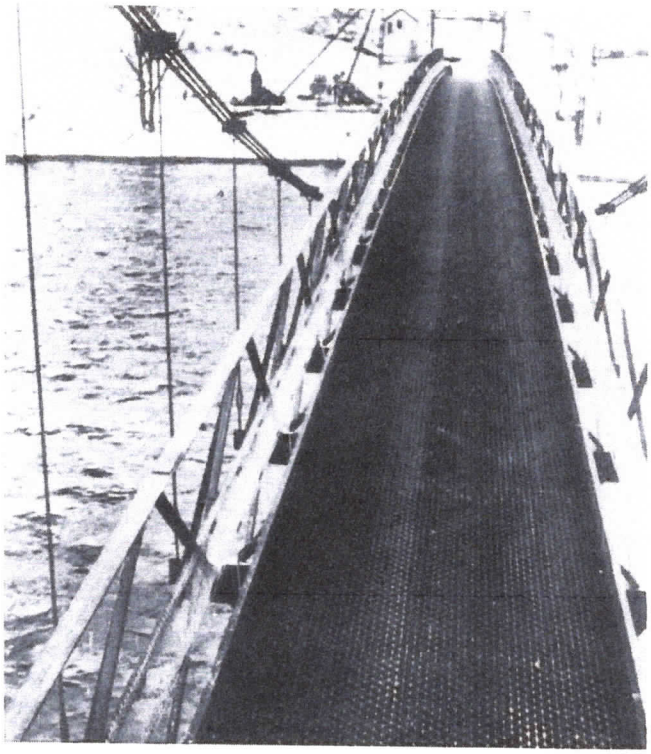


Marine Parkway Bridge, New York, with world's largest highway vertical lift span.

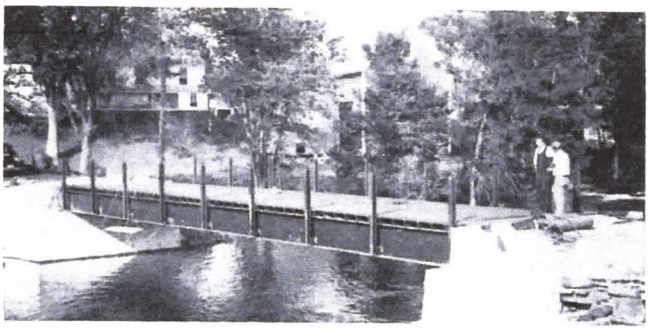
The enginers for the Marine Parkway Bridge inform us that $250,000 were saved on this structure through the use of Irving Decking on the Vertical Lift and two adjacent spans of this bridge.

New Long Span Bridges of all types are built much more economically with Irving Decking. Since the dead floor load will be only one-fifth to one-fourth of a concrete deck, a great saving is effected not alone in the floor system but in the entire structure.

While but little saving in cost of the structure can be figured for real short span fixed bridges, it is nevertheless well worth considering that once the stringers are in place it is a matter of but a few days before the bridge can be opened to traffic and detour delays eliminated. No forms to build; no reinforcing steel to place; no sand, stone and cement to be handled, hauled and mixed; no long wait after concrete is poured for it to harden, with its consequent attention and expense.

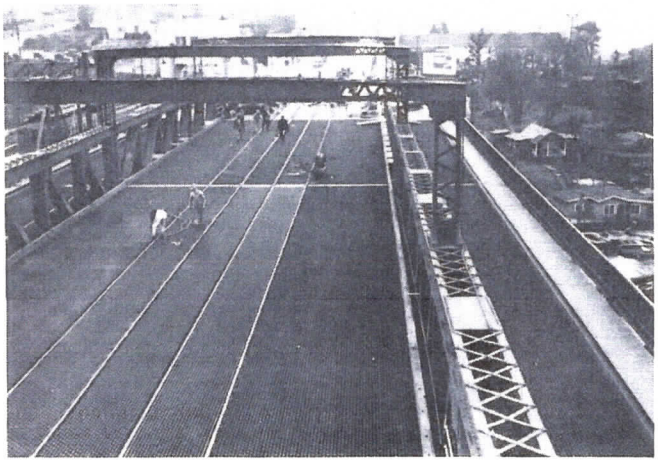


Irving Decking on suspension bridge.

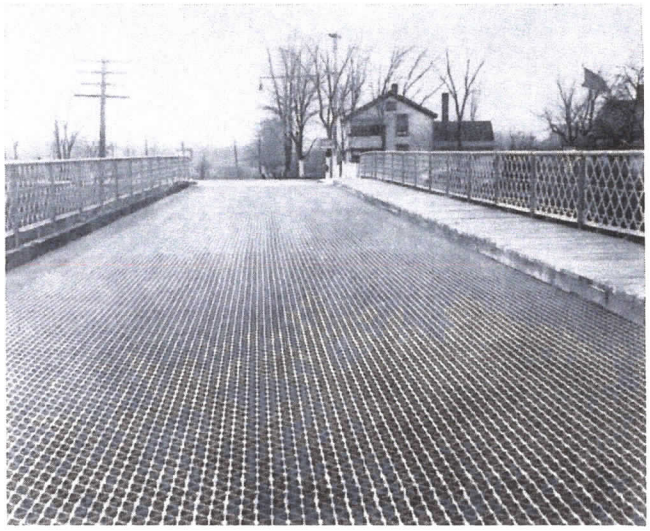


Irving Decking on a short span bridge

Overloaded Bridges handicapped by heavy solid floors can carry heavier live loads when refloored with light weight Irving Decking. Thus the cost of a new bridge may be saved in many cases.



Old Narrow Bridges, not wide enough to accommodate present day traffic, may be widened by the addition of wings, thus providing additional traffic lanes without overloading — by merely removing the old solid floor and replacing it with I.D., as shown in above bridge.

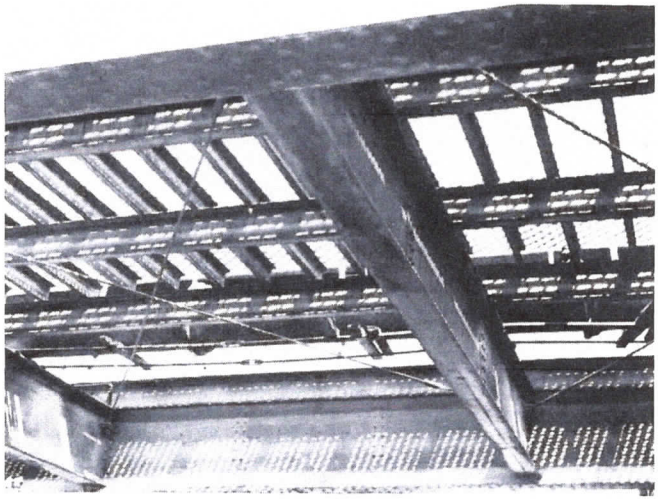


All Bridges are less expensive with Irving Decking because it minimizes maintenance cost. I.D. requires no repairs, replacements, sweeping, washing, snow-shoveling or sanding; prevents traffic delays, damages to vehicles, injuries and deaths to motorists, damage suits, fires, etc. Painting is the only maintenance that may be required and this no more often than the structure.

CORROSION KEPT AT MINIMUM

Irving Decking is open to sunlight and air currents, which combine to dry it quickly after rain.

Where traffic wears paint off the upper bar edges, oil and grease from passing autos, together with the polishing effect of traffic, will keep these upper bar edges free from corrosion.



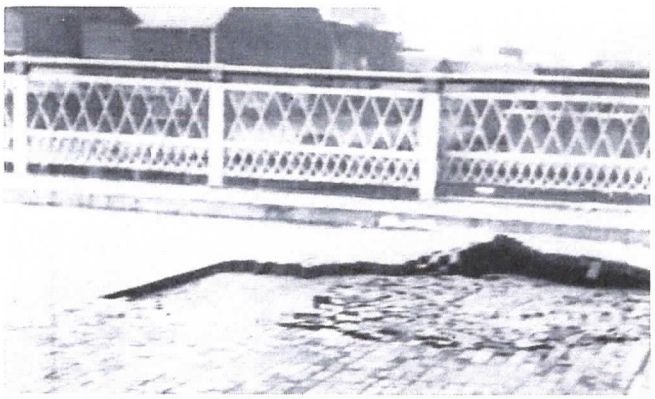
View of I.D. from below.

Further, all parts of Irving Decking are easily inspected from the upper surface and should corrosion appear, steps can be taken immediately to apply oil or paint, which is easily done by a paint sprayer.

MAINTENANCE NEGLIGIBLE

It is difficult to perceive where maintenance would be necessary on Irving Decking, except perhaps occasional spray painting—and this need not be done more often than the entire structure.

The history of Irving Decking on the Uni-

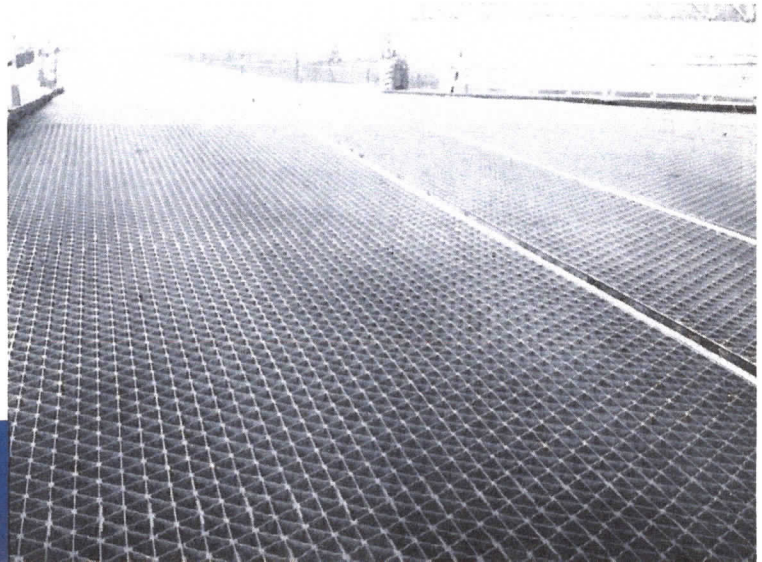


Avoid this with Irving Decking.

versity Bridge, Seattle, Wash., tells the story of negligible maintenance costs of this type of bridge in actual service. This job was opened to traffic April 1933. Ten years later the City Engineer wrote us that the original paint was in good condition, except where traffic had polished the top edges of bars which were bright and free from corrosion.

Incidentally sweeping, washing, snow-shoveling, sanding, etc., is not required on this deck.

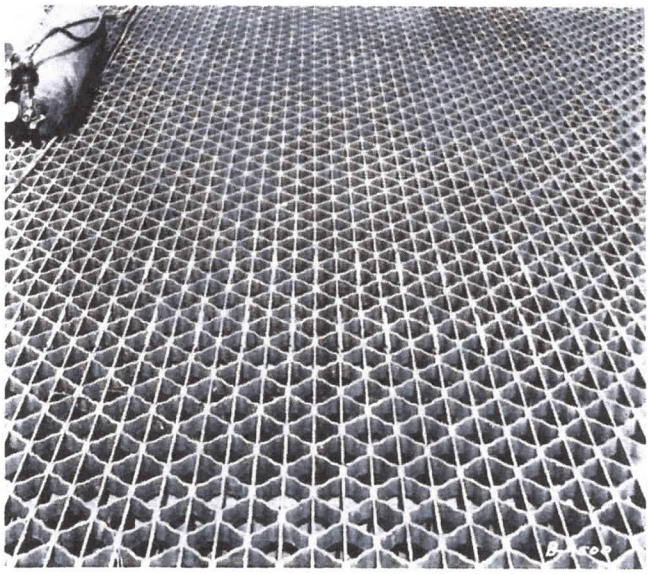
Irving Decking proved so satisfactory and economical in every way that since then the Fremont Ave. and Ballard bridges in the City of Seattle as well as the two approaches to the great Pontoon bridge over Lake Washington, have been floored with it.

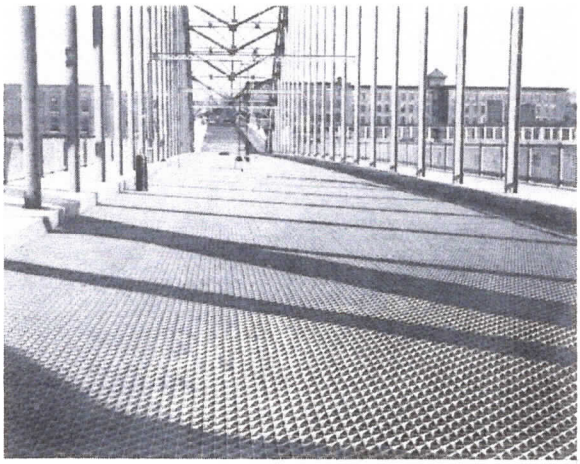


CONTINUOUS—ONE-PIECE

Irving Decking does not consist of a number of blocks which can loosen up, such as wood or granite; nor of a sheet of material that will eventually crack, disintegrate and become uneven, as in the case of concrete, or creep or flow as in the case of asphalt and other composition pavements.

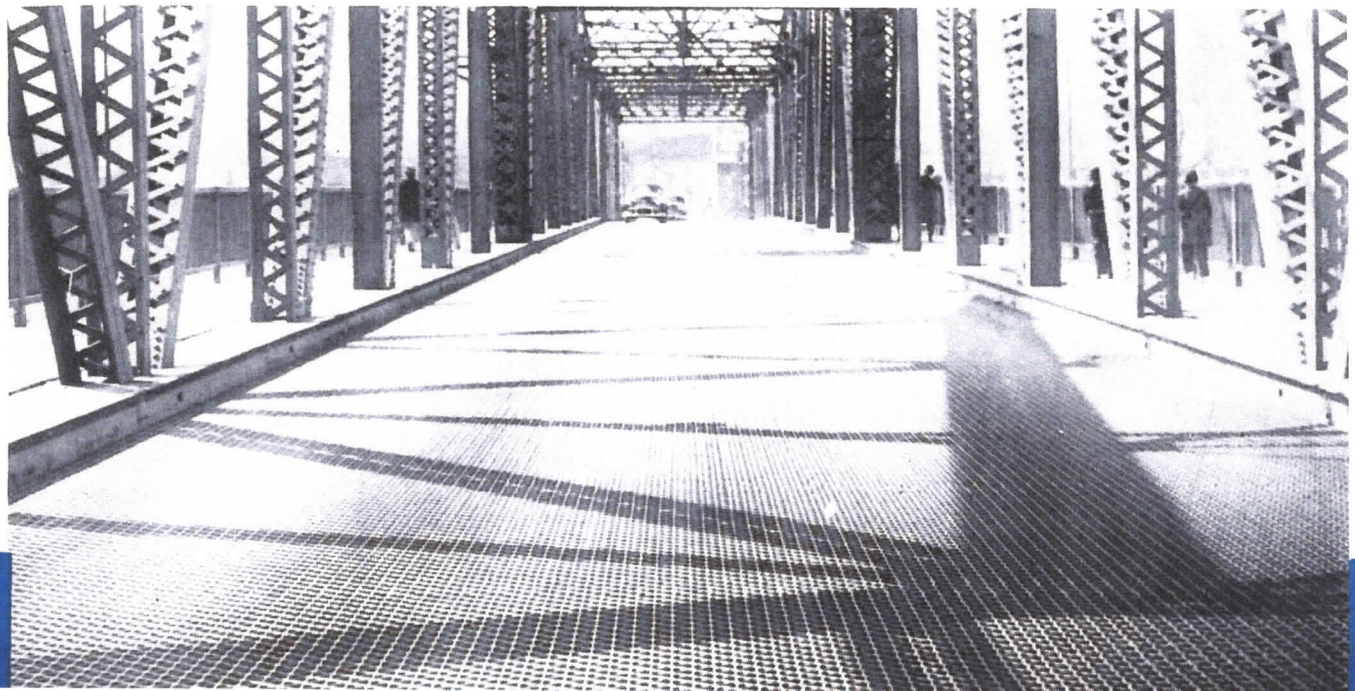
Irving Decking is shipped in units which are spliced together on the job to form a one-piece mat free from joints, cracks, breaks or seams for the entire length and width of the roadway. Thus CONTINUITY is achieved through the medium of the STREAMLINE SPLICE which is simply and inexpensively made in the field.





FLAT

Irving Decking, being self-draining, requires no crown, camber or pitch and can therefore be laid flat. Since a flat surface is the safest for automobile traffic, Irving Decking makes an ideal roadway.

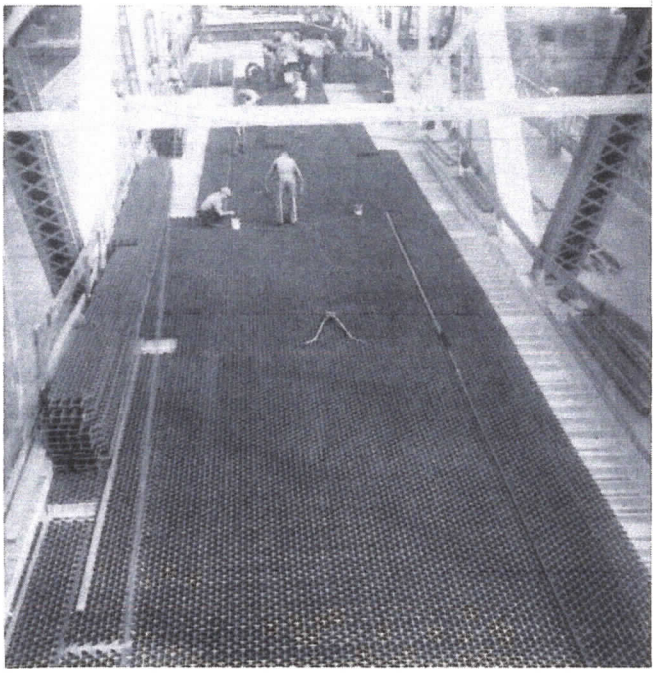


EASILY INSTALLED— ANY SEASON

Irving Decking is shipped in readily handled units which are easily and inexpensively spliced together on the job. Tools for cold riveting are loaned by us for the purpose.

Riveting the splices.

No dangerous and expensive scaffolding is required. Installation can be made in extreme cold or hot weather without difficulty or delay, and with minimum interruption to traffic.

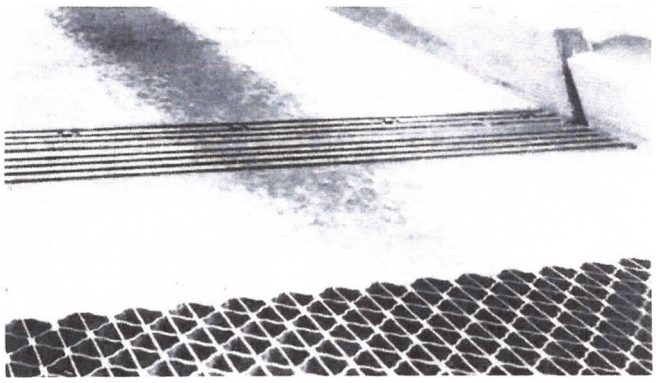


Placing Irving Decking units.

RETAINS CONCRETE FILL (where desired)

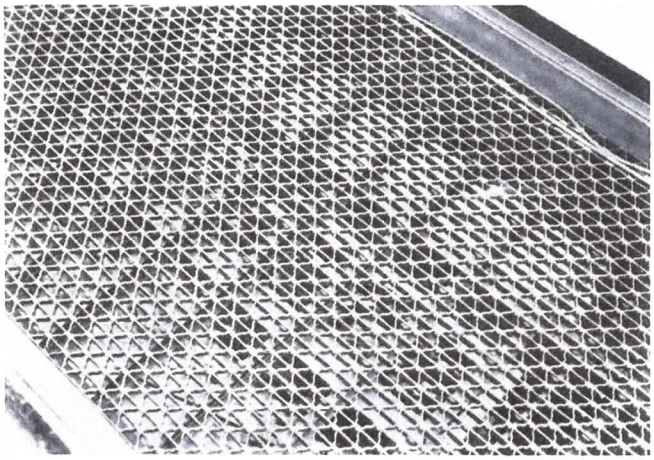
Where it is deemed advisable for one reason or another, any part of Irving Decking may be filled with concrete, as shown below.

On several lift bridges, portions of Irving Decking were filled with concrete, for obvious reasons, over the operating machinery, locking devices and pits. In such places we furnish our patented concrete retainer hooks.



PROTECTION FOR SUB-FLOOR MEMBERS

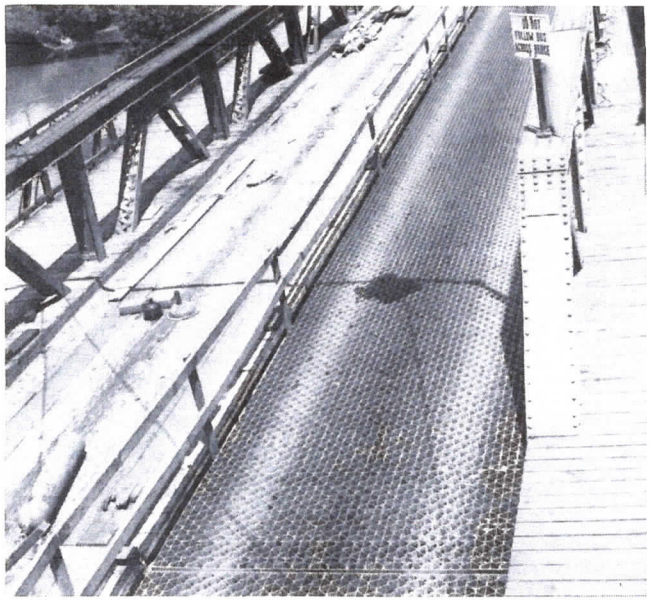
It is a fallacy to assume that the supporting members of a bridge are protected from corrosion by a solid floor acting as a roof. The solid floor prevents the sun and much air from drying these members and, as a consequence, the accumulation of dust on the supporting members plus the damp air and condensation of moisture keeps the steel members under the bridge almost continuously damp.



Irving Decking allows sub-floor members to be kept clean by the rain, and dry by air currents and sun rays passing through its meshes. Thus corrosion is greatly retarded.

The "reticuline" or crimped bars of Irving Decking do not rest on the sills supporting I.D. These bars are raised sufficiently above the sills to avoid pocketing on the top of flanges of sills anything that passes through the meshes.

Irving Decking also permits easy inspection of sub-floor members from the traffic surface, and any corrosion is easily detected in time to remedy.



SERVICEABLE IMMEDIATELY

Irving Decking can be used as soon as laid in place and spliced. Being of steel, and requiring no fill that needs time to harden, cure or cool —traffic can use it immediately without any delay.

Irving Streamline Splices

On the following two pages you will find drawings and illustrations of two splices. In specifying Irving Decking please state which type you wish furnished.

Both splices are of greater strength than the unspliced portions of the units, and the safeload tables shown on page 18 cover Irving Decking with either type of splice.

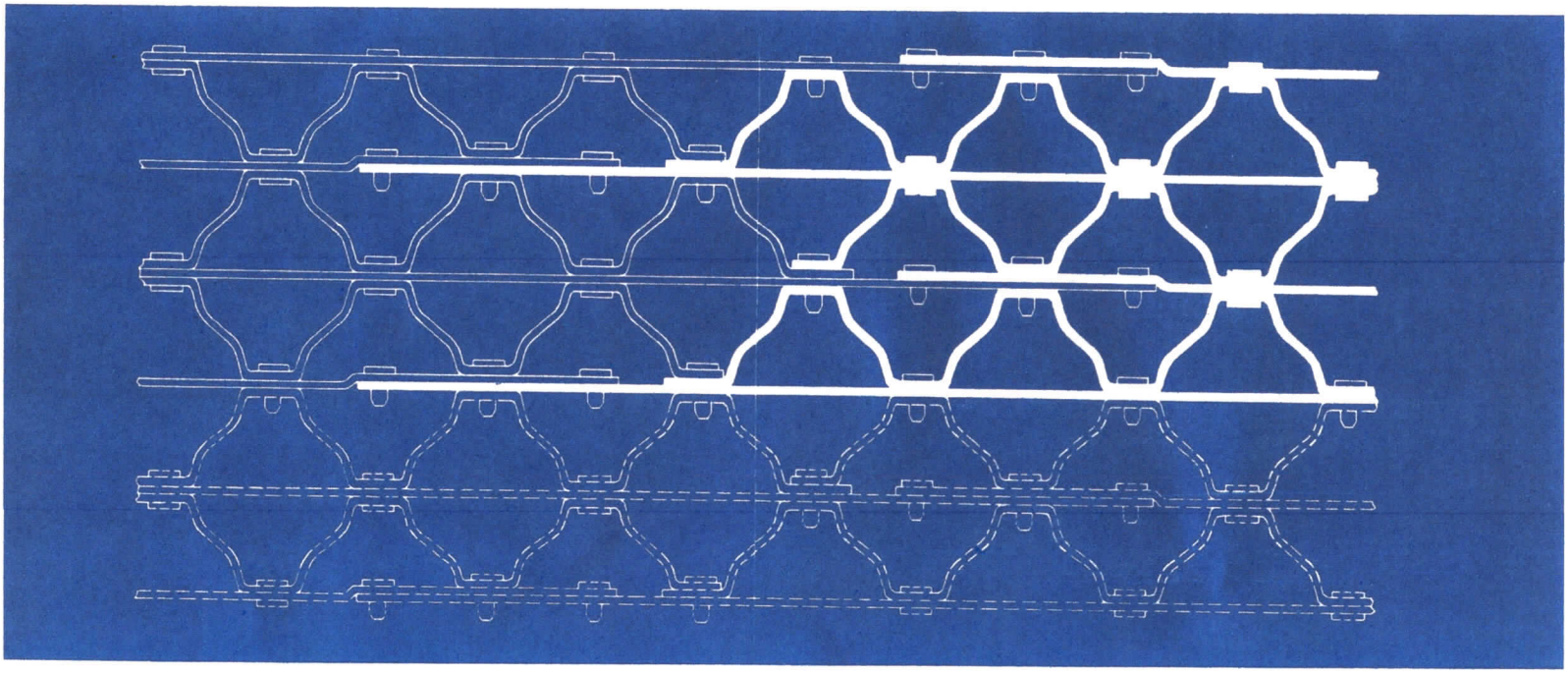
The original Irving Streamline Splice has been in use in various parts of the country for many years, the first installation in the world being in 1932 on the University Bridge in Seattle, Washington. We have as yet to hear the first complaint on its service performance. The field work consists of the insertion and squeezing of four rivets per bar in each end splice.

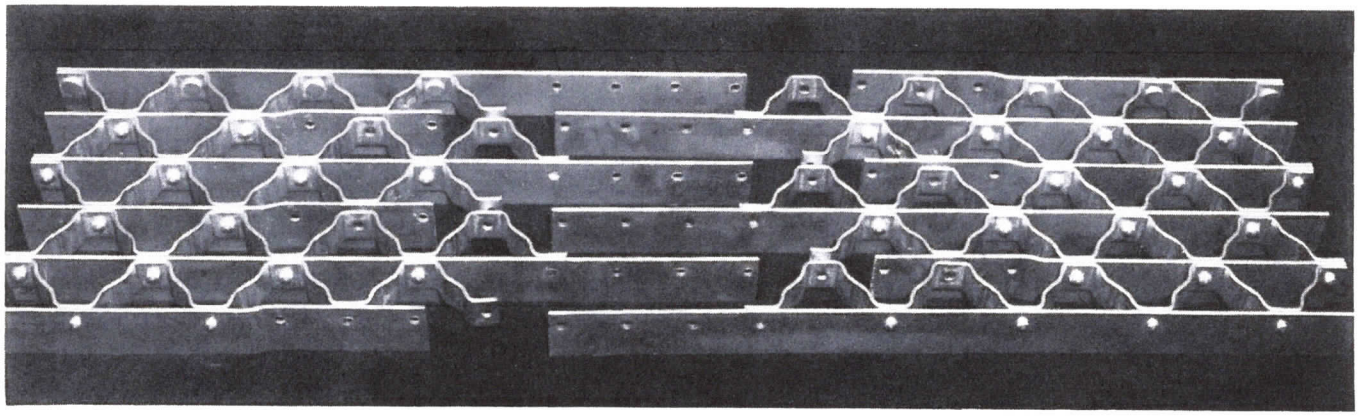
The Modified Irving Streamline Splice is of recent design. It differs from the Original Splice in that it makes installation a trifle simpler, and makes the riding surface more uniform by eliminating the overlapping splice bars from the surface. The field work in this splice entails the insertion of one rivet (which serves to line up splice bars and draw them together for welding) and one vertical field weld per bar in each end splice.

In both types, side splices of units are riveted.

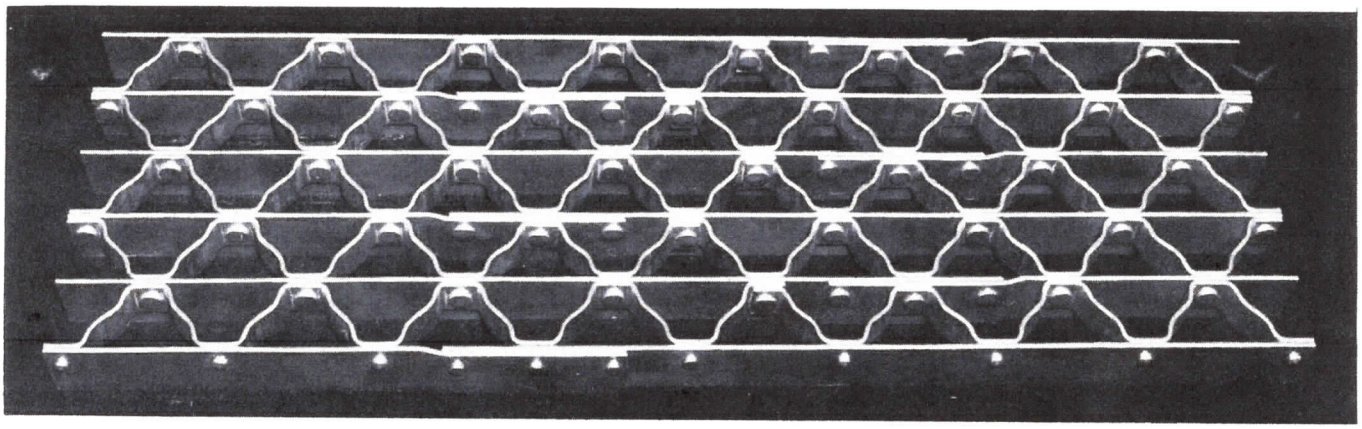
We recommend both of these splices. Some engineers will prefer the all-riveted splice while others will prefer the welded splice. The choice is left to your preference.

THE ORIGINAL IRVING STREAMLINE SPLICE



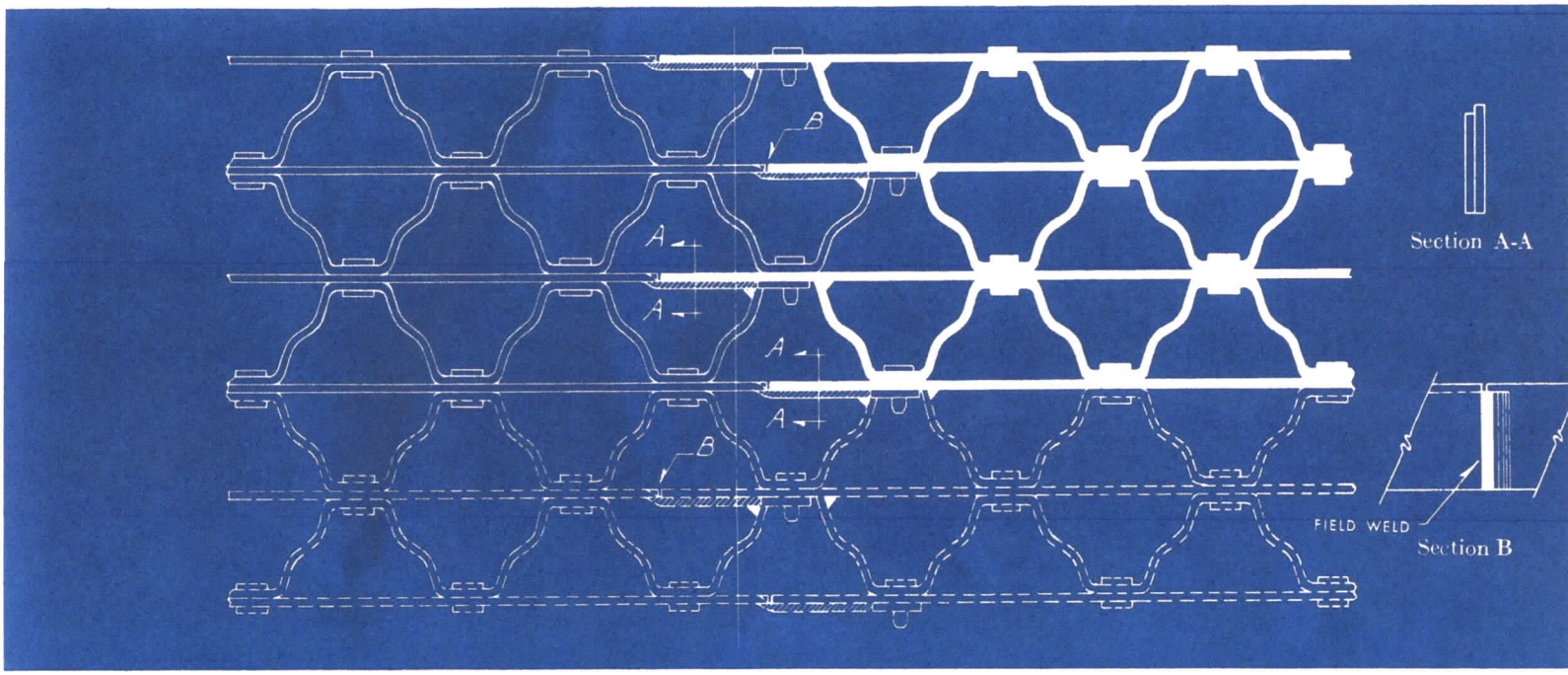


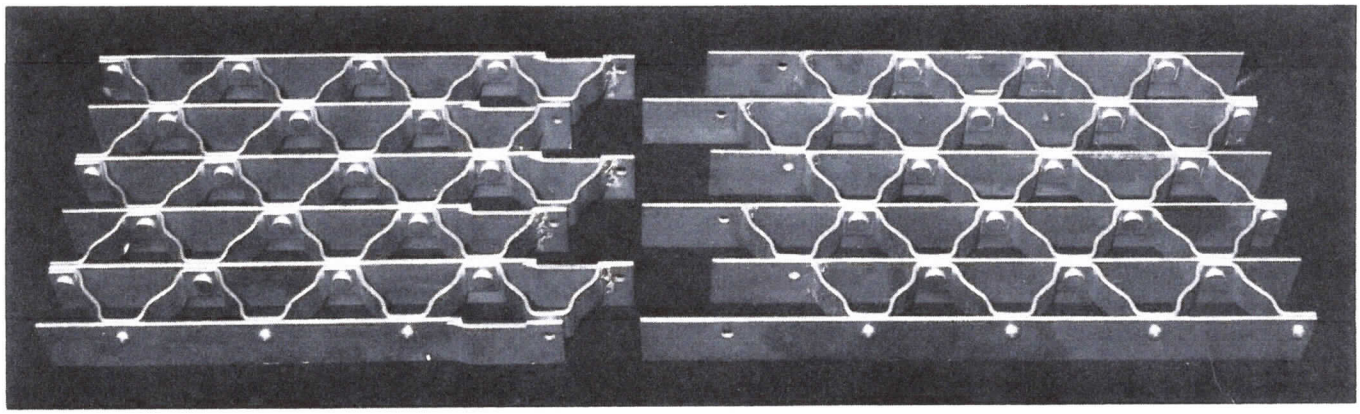
Before Splicing



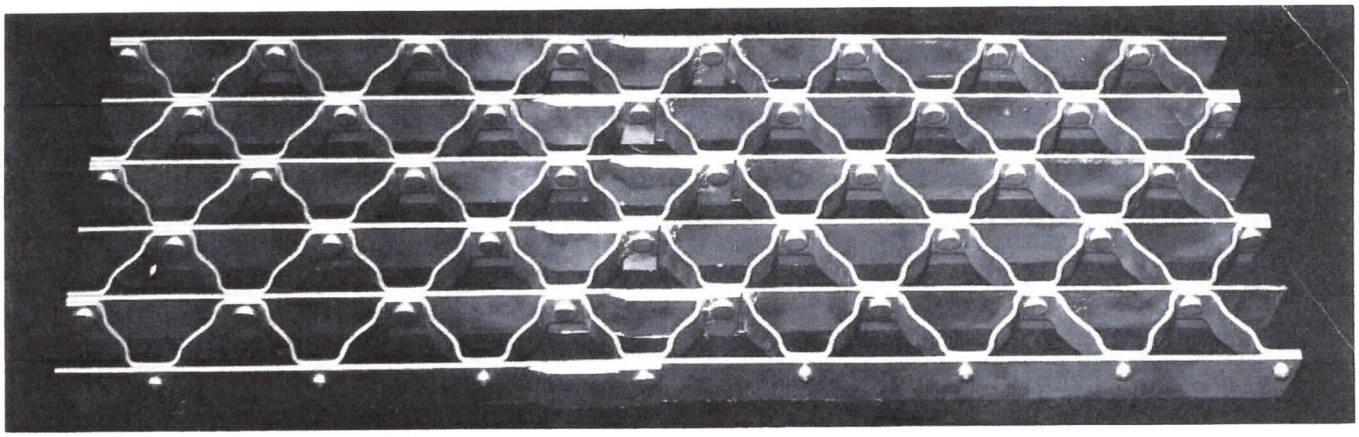
After Splicing

THE MODIFIED IRVING STREAMLINE SPLICE





Before Splicing



After Splicing

DATA

DESIGN OF MESH

IRVING DECKING is made in the Irving Type V Mesh which was developed especially for motorized traffic after considerable research work. On the opposite page is a full size isometric of the mesh.

DIMENSIONS

Standard Irving Decking consists of $2\frac{1}{2}''$ x 3/16″ carrying bars and $1\frac{1}{2}''$ x 3/16″ crimped bars and is riveted together with $\frac{3}{8}''$ cold driven rivets on 5″ centers. Carrying bars $2\frac{1}{2}''$ on centers.

MATERIAL

Standard Irving Decking is regularly made of Hot Rolled Strip Steel but can be made of aluminum alloys or other non-ferrous metals to meet your specifications.

WEIGHT

Standard Irving Decking weighs only $15\frac{1}{4}$ pounds per square foot.

SIZE OF UNITS

The major portion of an Irving Decking installation consists of our Standard units 2′-6″ wide by 25′-0″ long, which we carry in stock. Additional units of special dimensions necessary to complete the area are fabricated to meet the requirements.

SPLICES

Irving Decking units are so fabricated that when correctly assembled, perfect continuity is achieved for the entire area of the roadway.

EXPANSION JOINTS

Where expansion joints are required, a simple modification of the STREAMLINE SPLICE is employed and the holes are slotted. Splices in this case, of course, will be located directly over transverse sills.

FINISH

Irving Decking is finished with one shop dipped coat of our own standard specification priming paint.

STRENGTH

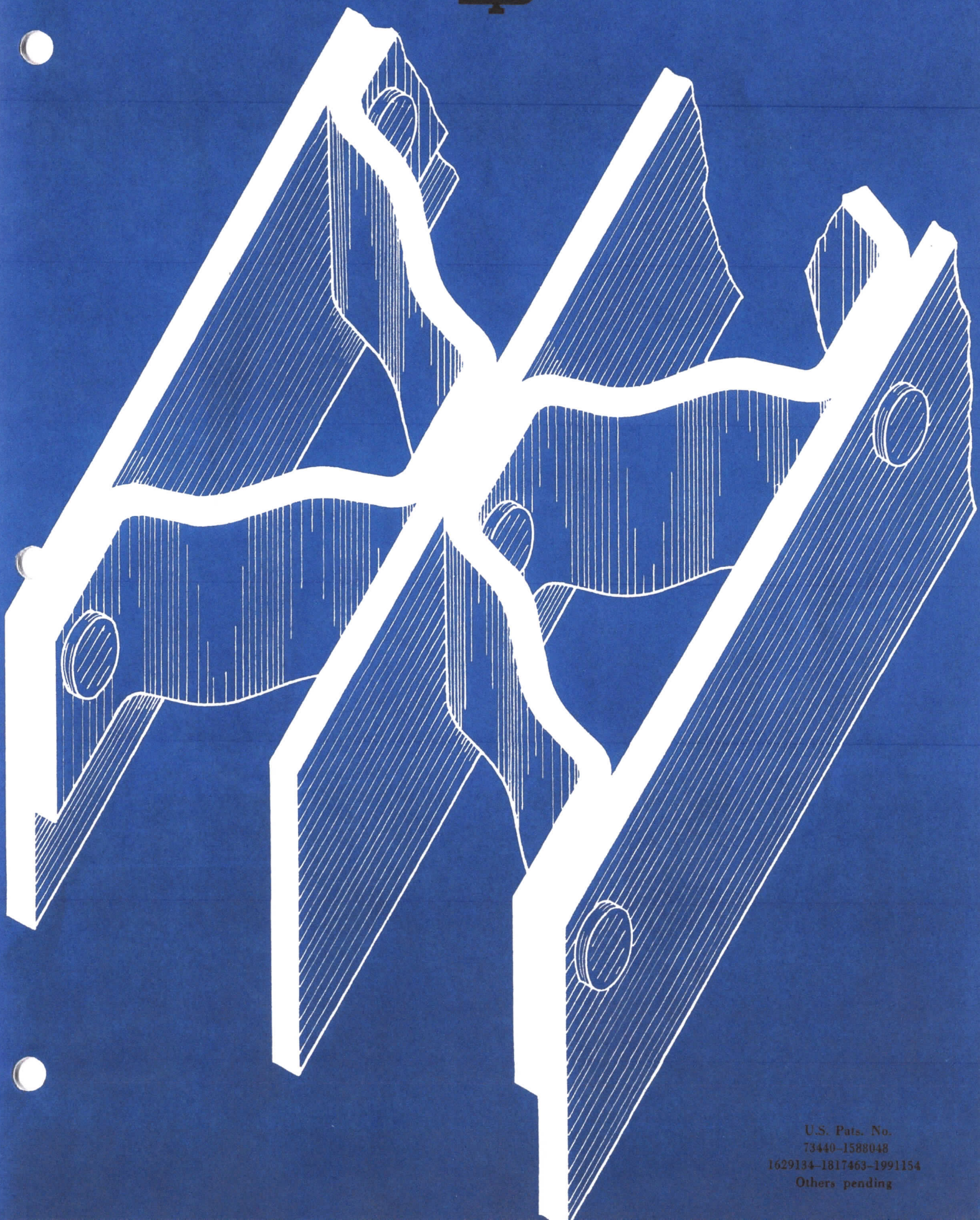
As indicated in the table at the right, Irving Decking is good for the heaviest live loads. Irving Decking is recommended for the spans and loads shown at right only when bearing bars run lengthwise of the bridge, the usual procedure.

SAFELOAD TABLE

Loading	Span
H-20	18″
H-15	19″
H-10	20½″

30% Allowed for Impact.

IRVING LIGHT AND EVERLASTING DECKING

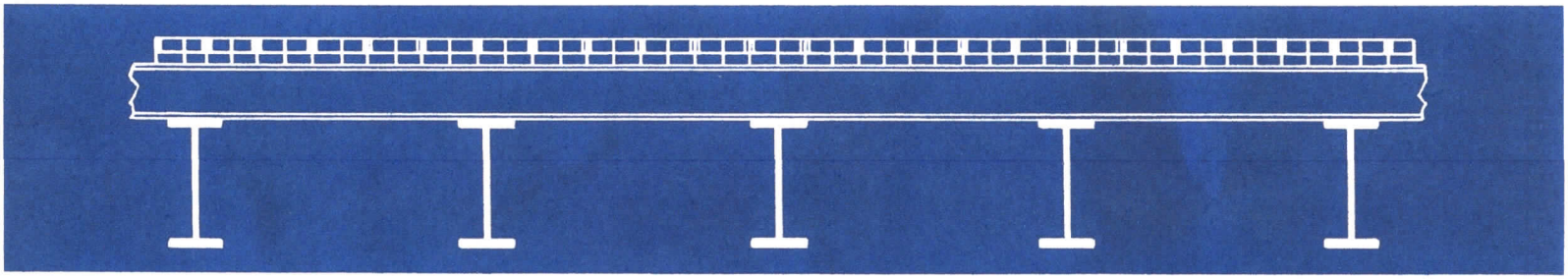


U.S. Pats. No.
73440–1588048
1629134–1817463–1991154
Others pending

METHOD OF SUPPORTING

Irving Decking rests on supports or sills. The section and spacing of these sills depend of course upon the stringer spacing and the loads to be carried. We do not furnish these sills or supports but are pleased to make recommendations if you will accompany your request with blue prints or sufficient data to permit us to do so. On page 21 you will find recommendations for varying loads and stringer spacings.

The following drawing illustrates a typical cross section of a bridge with Irving Decking.



Typical Cross Section of Bridge

For maximum safety, the straight bars of Irving Decking should run in the direction of traffic.

When riding in the direction of the bearing bars (indicated by the black arrow in Fig. 1) the tires double-flange the straight or bearing bars and are guided directly forward as though they were on rails. When wheels are braked, this insures maximum prevention of side-skid. At the same time, the peculiarly shaped reticuline bar is designed to give a brake and yield reaction, thus retarding the forward motion of the automobile gradually and without tire damage. There are no sharp angles in Irving Decking as there are in our former obsolete type (see Fig. 2) to tear knobs off tires, catch loose chains, horse shoe caulks and collect dirt.

When riding over any bar-on-edge open steel mesh decking with bars at right angle to the direction of traffic, the flanged wheel and rail combination is not only eliminated, but when wheels are locked, the bars at right angle to traffic induce side-skidding because the car cannot slide forward.

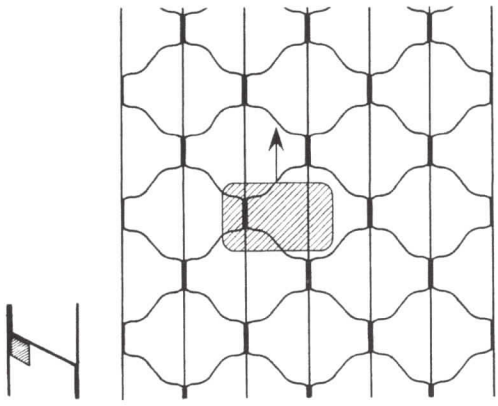


Fig. 2 Fig. 1

TABLE OF REQUIRED TRANSVERSE SILLS FOR VARYING LOADS AND STRINGER SPACINGS.

Design Conditions	1. Allowable Stress 18,000#/sq. in. 3. Continuity Coefficent 80% 2. Impact 30% 4. Wheel Load 50% (The design for shear and buckling is governed by 100% wheel load)

Maximum Transverse Sill Spacings—H-20, 18″; H-15, 19″; H-10, 20½″

Transverse Sills		Loading H-20		Loading H-15		Loading H-10	
Channels		Stringer Spacing		Stringer Spacing		Stringer Spacing	
Depth	Weight	From:	To:	From:	To:	From:	To:
3″	4.1#	.....	.....	.....	.....	2′-0″	2′-2⅜″
3″	5.0#	.....	.....	.....	.....	2′-2⅜″	2′-4⅛″
4″	5.4#	2′-0″	2′-2″	2′-0″	2′-8″	2′-4⅛″	3′-2⅞″
4″	6.25#	2′-2″	2′-6½″	2′-8″	2′-10⅛″	3′-2⅞″	3′-7⅛″
5″	6.7#	2′-6½″	2′-10⅛″	2′-10⅛″	3′-8⅜″	3′-7⅛″	4′-4¾″
6″	8.2#	2′-10⅛″	4′-1⅛″	3′-8⅜″	4′-11″	4′-4¾″	6′-8″
7″	9.8#	4′-1⅛″	5′-3½″	4′-11″	6′-6″	6′-8″	9′-0″
8″	11.5#	5′-3½″	6′-9½″	6′-6″	8′-6″	9′-0″	10′-0″
9″	13.4#	6′-9½″	8′-6″	8′-6″	10′-0″	.....	.....
9″	15.0#	8′-6″	8′-10⅛″	.....	.....	.....	.....
10″	15.3#	8′-10⅛″	10′-0″	.....	.....	.....	.....

Transverse Sills		Loading H-20		Loading H-15		Loading H-10	
I Beams		Stringer Spacing		Stringer Spacing		Stringer Spacing	
Depth	Weight	From:	To:	From:	To:	From:	To:
3″	5.7#	.....	.....	2′-0″	2′-1½″	2′-0″	3′-0½″
3″	6.5#	2′-0″	2′-3″	2′-1½″	2′-6½″	3′-0½″	3′-2⅜″
3″	7.5#	2′-3″	2′-5¾″	2′-6½″	2′-8″	3′-2⅜″	3′-3⅞″
4″	7.7#	.....	.....	2′-8″	3′-1¾″	3′-3⅞″	4′-10½″
4″	8.5#	2′-5¾″	3′-1¾″	3′-1¾″	3′-11″	4′-10½″	5′-1¾″
4″	9.5#	3′-1¾″	3′-4½″	3′-11″	3′-11⅝″	5′-1¾″	5′-3½″
5″	10.0#	3′-4½″	3′-7⅛″	3′-11⅝″	5′-4¾″	5′-3½″	7′-4⅛″
5″	12.25#	3′-7⅛″	4′-10¾″	5′-4¾″	5′-11⅜″	7′-4⅛″	8′-2⅜″
6″	12.5#	4′-10¾″	6′-3″	5′-11⅜″	7′-9¼″	8′-2⅜″	10′-0″
6″	14.75#	6′-3″	6′-7¾″	7′-9¼″	8′-3½″	.....	.....
7″	15.3#	6′-7¾″	8′-5″	8′-3½″	10′-0″	.....	.....
8″	17.5#	8′-5″	10′-0″	.....	.....	.....	.....

SPECIFICATIONS FOR OPEN MESH STEEL PAVEMENT

1. The deck shall be of open steel mesh grating, of uniform pattern, continuous in all directions. The design of mesh to be as shown on the drawings.

2. It shall be made of alternate straight or carrying bars and shallower crimped or bracing bars on edge, riveted together with 3/8″ cold driven rivets 5″ on centers, with all top edges of bars flush.

3. Carrying bars shall be made of 2½″ x 3/16″ steel, sufficiently strong to carry the load specified. Bracing bars to be of 1½″ x 3/16″ mild steel.

4. The decking shall be furnished in units fabricated in such manner as to permit side splicing and end splicing of units together on the job so as to form a continuous pavement. It shall be free from joints or cracks and of uniform pattern for the entire length and width of the roadway, except where provision must be made for trolley rails, expansion joints, bridge closure or other interference.

5. The decking at the splice and other points shall be good for a ——— loading on a ——— inch span, proof of which shall be submitted on request.

6. Straight or Carrying bars of adjacent panels must overlap longitudinally at least 3¾″ to form the end splice. The overlapping portions of end bars in one panel must be offset 3/16″ to preserve alignment of carrying bars. Splices must be made of constituent bars of the panel only.

- Applying to the *ORIGINAL* Streamline Splice only:

  The field splices of carrying bars will be made with three 3/8″ pointed steel rivets driven cold.

  Free ends of bracing bars at splice to be riveted to adjoining carrying bars with 3/8″ pointed steel rivets.

- Applying to the *MODIFIED* Streamline Splice only:

  The offset portion of the carrying bar shall be coped down from the top edge 3/16″, excepting the 1½″ at its end.

  The field splices of carrying bars will be made with one 3/8″ pointed steel rivet, driven cold, and one vertical field weld for the full depth of bars.

  Free ends of bracing bars at the splice are to be vertically welded for their full depth at the points of contact with adjacent carrying bars before leaving shop.

7. Tools for driving field rivets to be loaned by the decking manufacturer.

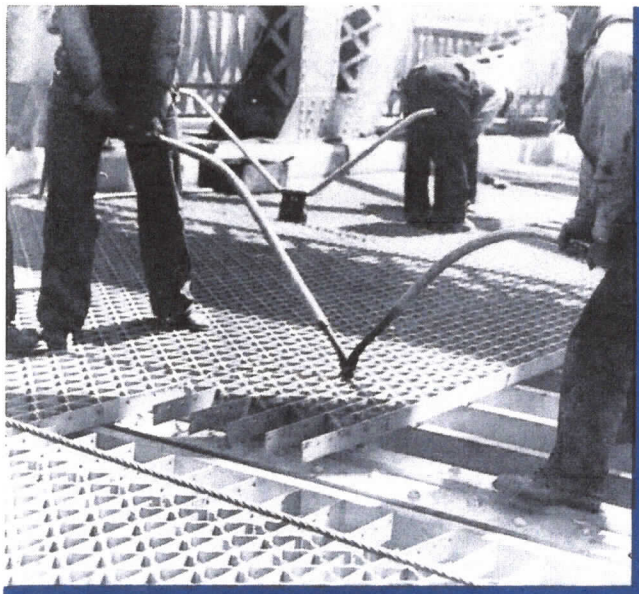
8. Side splices shall be made with 3/8″ pointed rivets, cold driven in the field.

9. The decking shall be given before shipment one dipped coat of Irving standard specification priming paint.

10. The decking, after assembly on the bridge, shall be welded to supports in accordance with engineer's specifications.

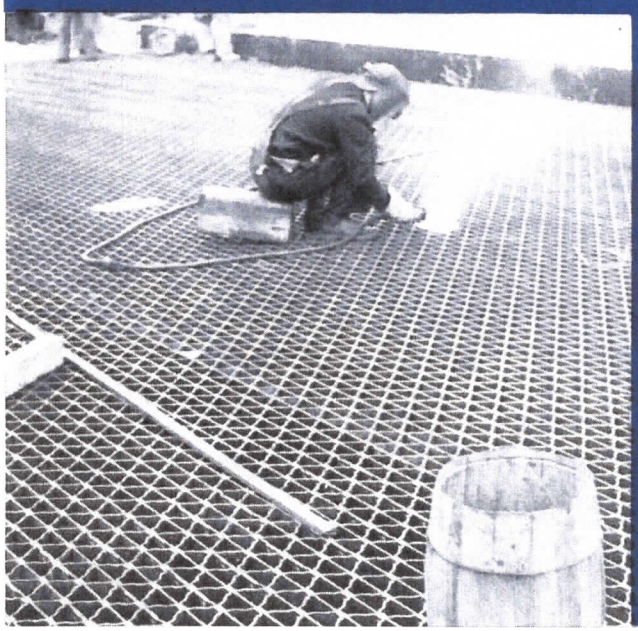
FIELD WORK

The installation of Irving Decking is a simple matter because it is precision manufactured. (1) The units are laid in place and the ends of bars meshed. (2) The overlapping straight bars are riveted with tools loaned by us. This assures lining up of the decking. If the Modified Splice is used, free ends of offset bars are welded. If the Original Splice is used, the free ends of reticuline bars are riveted.. (3) Side bars of units are riveted to adjacent panels. (4) The decking is then welded to sills. (5) A field coat of paint is applied with paint sprayer.

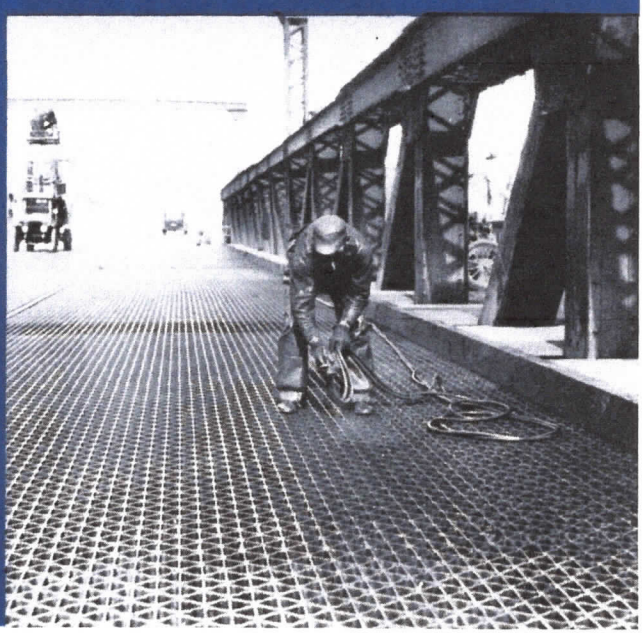


Meshing Units

Riveting Splices



Welding Splices and Units to Sills



Spray Painting Field Coat

GRATINGS OF ALL KINDS

We are the pioneer grating manufacturers and can furnish a full line of riveted, press-locked and welded types of gratings. Ask for our latest catalogue on Irving Grating Products.

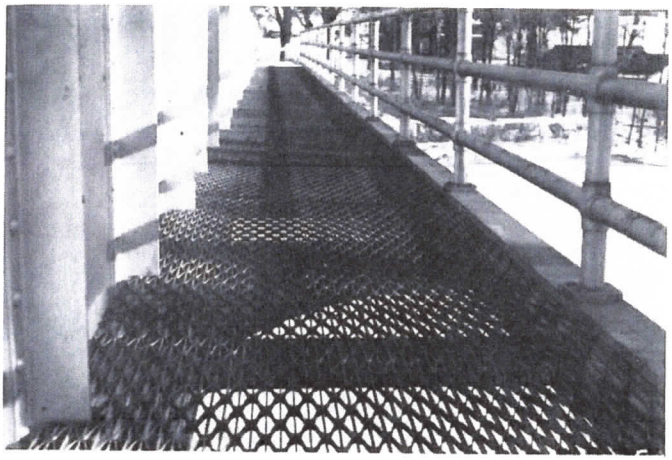
BRIDGE SIDEWALK GRATINGS

We have many installations of Irving Subway Grating as sidewalks on bridges. Many of the advantages mentioned in this catalogue as applying to Irving Decking under vehicular traffic also apply to Irving Subway Grating used as sidewalks on bridges for pedestrian traffic, such as lightweight, cleanliness, safety, etc.

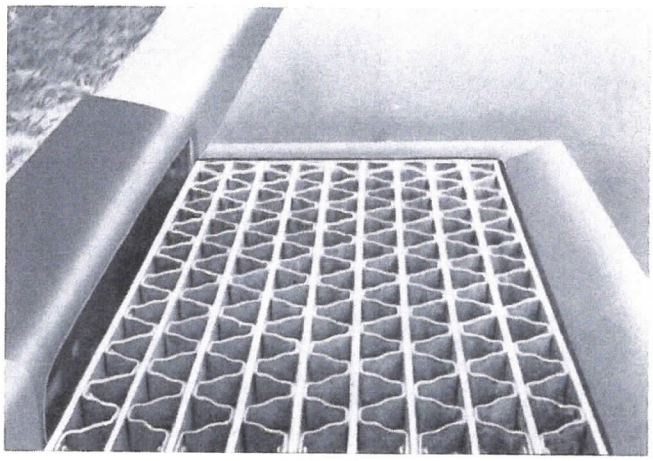
IRVING "DRYWAY" COVERS

Keep your Highway a Dryway with Irving "Dryway" Covers—for Gutter Catch Basins, Drains, etc.

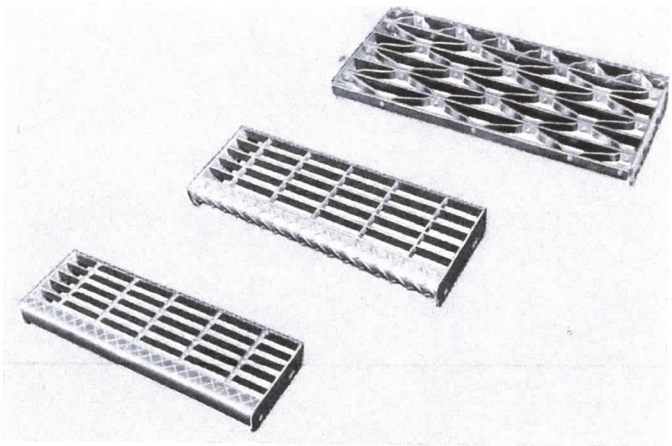
Advantages: Maximum opening for drainage; self-cleaning—won't collect snow; strong; steel —uncrackable; lightweight for easy handling; safe, non-skid surface; economical; efficient.



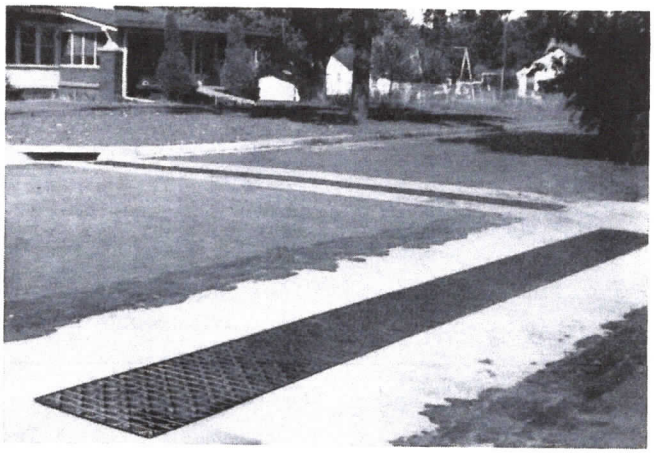
Irving Subway Grating
Bridge Sidewalk



Irving "Dryway" Covers
for Catch Basin



Irving "Vizabledg" Steps
for Bridge Stairway



Irving "Dryway" Cover
for Curb to Curb Drains