PROFILED STEEL SHEETS
Steel deck is made by cold forming structural grade sheet steel into a repeating pattern of parallel ribs. The strength and stiffness of the panels are a result of the shape of the ribs and the material properties of the steel. The present version of the Indian Standard for Cold Rolled Cold Annealed (CRCA) steel (IS 513) is not rich in content in respect to the structural applications that CRCA steel has been witnessing in the country. With hot rolled (HR) Steel long available in grades like Yst 240 and Yst 310 for processing into CR steel, the exclusion of structural grade steel from IS 513 remains an enigma. Indian steel manufacturers also make Yst 550 grade of HR and thus availability of high tensile structural steel is a reality for structural grade CRCA material. However, because of the low ductility of high tensile steel (elongations are generally about 1 to 4% for Yst 550 grade CR), its use for deck applications where they act as formwork to support green concrete and unforeseen erection loads until the slab attains its properties may not be wise.

Transport considerations would generally limit the length of deck sheets to about 7.2 m. The sheets are furnished in standard width with ends square cut. Any cutting for width, e.g. cuts for openings, angular fits etc. are done at the job site by the fitting crew.

SACRIFICIAL SHUTTERING (FORM DECK)
Profiled steel sheets as sacrificial shuttering is a concept widely accepted in recent times for fast track construction. It has been established as a pragmatic solution for tall industrial buildings where conventional shuttering props would have been highly impractical. With commercial construction fast gaining ground, and providing faster occupancy translates into sound business logic, profiled deck sheets as sacrificial shuttering has become an obvious choice. Its advantages are not only techno-economic but also highly practical and utilitarian.

- Stronger than conventional shuttering
- Practically propless - free space for parallel activities
- Gives congestion-free area during construction
- Simultaneous casting of multiple floors possible
- Material and sectional properties impart additional strength to finished concrete slab during service period
- Profile shapes provide additional space for nesting service lines within the notches
- Faster to install than conventional shuttering
- Available in multiple material choices

STEEL - CONCRETE COMPOSITE DECK
In addition to acting as a form deck (shuttering) during the construction period, composite deck sheets substitute the tensile reinforcement in the concrete slab. This is made possible by the composite action developed between two dissimilar materials like concrete and steel by the provision of shear connectors at the interface of the two materials. These shear connectors are embossments in the deck sheets in typical pattern unique to each profile. These embossments develop friction as well as mechanical interlock between the concrete and steel sheet. These two reactions take care of longitudinal shear developed at the interface of the concrete and steel sheet, preventing slip and thereby enabling the two materials to act as a single entity of composite deck. To ensure friction at the embossments, there should not be any paint or grease on the sheet surface in contact with concrete nor should any vibrating load be permitted to act on the slab until the concrete has set completely and composite action has developed.

The friction between the steel sheet and concrete is expressed by a co-efficient denoted as “k” while the mechanical interlocking between steel and concrete made effective by the embossments is denoted by “m”. The design of the composite slab is entirely governed by these two coefficients “m” and “k” which are also known as the shear-bond values of a composite deck sheet.

It is not enough merely to incorporate the embossments on a profiled sheet to proclaim composite slab action. Each profile with its embossment is unique and will have its own unique shear-bond value. This unique shear-bond value is mandatory to be established through extensive laboratory tests (BS 5950 : Part 4, EUROCODE 3) as per guidelines laid down in the standard before the profile can qualify as a true, established composite deck sheet.

CRIL DECKSPAN has been parametrically tested independently and separately at Structural Engineering Research Centre (SERC), Chennai and Coimbatore Institute of Technology (CIT). The test results at the two institutes have been compared and thereafter CRIL DECKSPAN has been certified as having m = 88 MPa and k = 0.032 MPa which may be used for design of composite slab capacity as per BS 5950 Part 4 / Eurocode 3.

[Refer Guidebook for design of Embossed Profiled Sheets Acting as Composite Deck published by Institute of Steel Design & Growth, INSDAG]
Available Lengths
- Standard lengths - 2 m, 3m and 4m
- A-la-carte lengths - 300mm to 6.2m.

Application
- Steel deck for mezzanine floors
- Tensile steel for composite slab construction that cuts down on slab thickness and dead weight of buildings. No separate formwork required for slab casting.
- Form deck / sacrificial shuttering

Available Thickness
- 0.8 mm, 1.0mm and 1.2 mm.

Available Finish
- CRCA and Galvanised. Pre-painted GI (for special orders only).

CRIL DECKSPAN™ AS SACRIFICIAL SHUTTERING
ALLOWABLE LOADS IN KG. PER METRE WIDTH OF SHEET (i.e. KG / SQ.M)

<table>
<thead>
<tr>
<th>SL</th>
<th>THICKNESS (in mm)</th>
<th>APPROX. WT PER METER LENGTH OF PROFILE</th>
<th>MODULUS OF SECTION (cm³)</th>
<th>MATERIAL GRADE</th>
<th>SPAN IN METERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Fy in Mpa) 10.0</td>
</tr>
<tr>
<td>1.1</td>
<td>0.8</td>
<td>6.91 KG/M</td>
<td>16.79</td>
<td>250</td>
<td>2015</td>
</tr>
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<td>1.0</td>
<td>8.64 KG/M</td>
<td>22.50</td>
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<td>2700</td>
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<td>1.3</td>
<td>1.2</td>
<td>10.36 KG/M</td>
<td>27.63</td>
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<td>3315</td>
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<tr>
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<td>16.16</td>
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<tr>
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<td>1.0</td>
<td>21.72</td>
<td></td>
<td>310</td>
<td>3336</td>
</tr>
<tr>
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<td>27.47</td>
<td></td>
<td>310</td>
<td>4219</td>
</tr>
</tbody>
</table>

NOTES
1. Deflection considered as 1/250.
2. Working stress has been considered as 0.6Fy.
3. All properties are for 1 metre width of profile.
4. Loads are for end spans for continuous spans load may be increased by 1.25 times.
5. Thickness shown are standard for DECKSPAN, and 0.8 mm is the minimum recommended by all available standards and CRIL considering the nature of use, corrosive elements from concrete etc.
6. GALVALUME® and pre-painted GALVALUME® is not recommended for use in contact with concrete by BIEC International, USA. Reference may be made to the GALVALUME® website in this connection.

FOR COMPOSITE SLAB LOAD TABLES CONTACT CRIL MUMBAI SALES OFFICE