KUBES STEEL

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A KUBES STEEL EDUCATIONAL SERIES

STRAIGHT TALK ON CURVED STEEL

PART 2 OF 3 · CURVED STEEL IS EASIER TO DESIGN THAN YOU THINK



CURVED STEEL IS EASIER TO DESIGN THAN YOU THINK

AISC Design Guide 33 Changed the Game. Most Engineers Don’t Know It Yet.

Designing Curved Steel No Longer Requires Specialized Software or Complex Analysis.

For years, many structural engineers avoided specifying curved steel because they assumed it meant complex secondary analysis, specialized software, and extra

engineering hours. AISC Design Guide 33 eliminated that barrier. Here's what it means for your next project — and why curved steel should be back on the table.

WHAT AISC DESIGN GUIDE 33 ACTUALLY SAYS

The central finding of AISC Design Guide 33 is straightforward and significant: **under normal building construction conditions, curved members can be treated as equivalent straight members for design purposes.**

This means engineers can use the same commercial software they already use for straight steel — STAAD, RAM, RISA, or any standard structural analysis package — to design curved members. No specialized curved-beam analysis. No secondary stress calculations that don't appear in straight member design. The curved geometry is handled by the bender-roller, not by the engineer's analysis model.

The practical implication: if you can design a straight W18×97 beam, you can specify a curved one. The design process is essentially the same — for the vast majority of building construction applications.

Note: Members subject to very tight radii, fatigue or seismic loading, AESS requirements, or other unfavorable service conditions may require additional design considerations. Design Guide 33 addresses these cases in detail.

MYTH VS. REALITY

MYTH

"Curved steel requires specialized structural analysis software I don't have."

REALITY

Design Guide 33 confirms you can use your existing software. Model it as a straight member, apply loads, check the output. The bending process doesn't change the steel's structural properties.

MYTH

"Curved steel costs significantly more than straight steel."

REALITY

The base steel cost is the same — you're buying the same section. The additional cost is the rolling process, which is often offset by eliminating labour-intensive alternatives like segmented curves or built-up sections. In some cases — particularly curved HSS in demanding

service conditions — a higher-spec material grade may be warranted, but for the vast majority of building applications this is not a factor.

MYTH

“You can’t get consistent tolerances across a production run of curved sections.”

REALITY

AISC Design Guide 33 confirms that tolerance requirements for curved members follow the same AISC Code of Standard Practice as straight members. With the right equipment and experienced operators, curved sections are produced to tight, repeatable tolerances across large production runs. The truck in the photo above is proof — every beam on that load was rolled to the same radius, meeting the same standards as any straight structural member.

THREE WAYS KUBES STEEL BENDS — AND WHEN TO USE EACH



HSS COLD BENDING

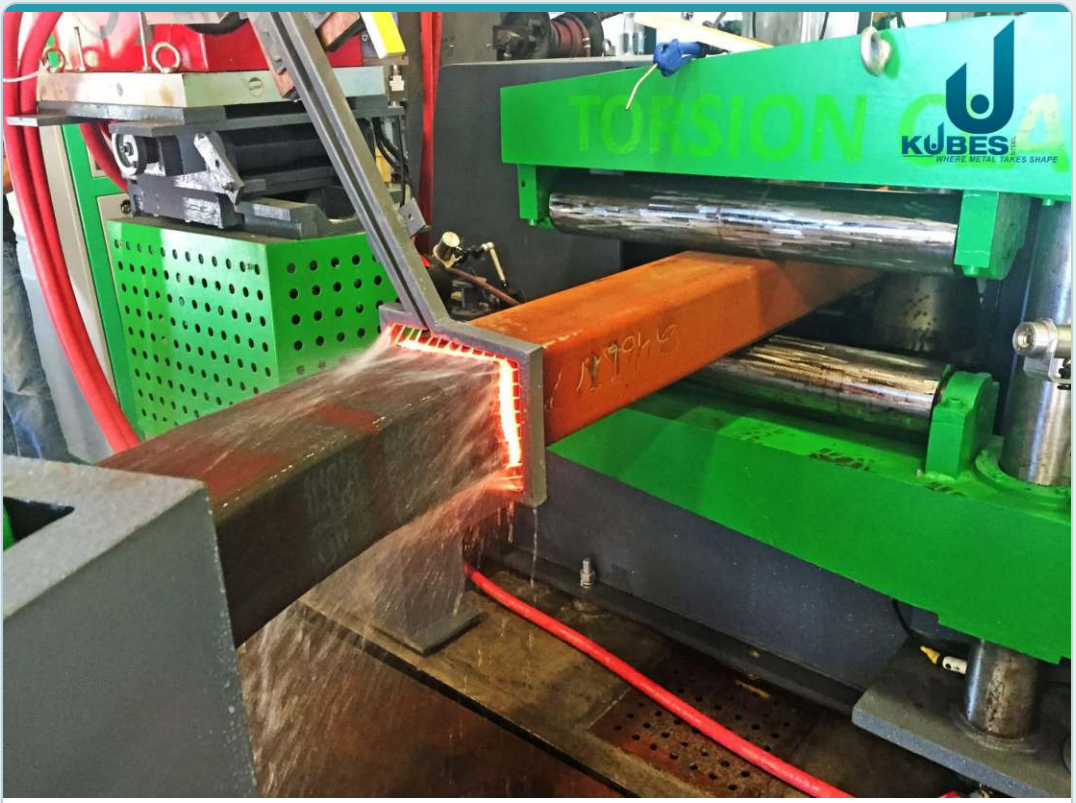
Cold Rolling Structural & HSS Sections

Cold bending uses mechanical force at ambient temperature to bend HSS, wide flange, channel, angle, and other structural sections to a specified radius. It’s the most

economical method for the vast majority of curved steel applications — no heat affected zone, and material properties are generally unaffected within normal building construction strain limits. Kubes Steel operates one of the largest selections of section bending equipment in Canada, handling sections to 44″ depth.

There are cases where the required geometry or radius cannot be achieved by cold bending alone — particularly for large diameter pipe, very tight radii, or heavy wall sections. That's where induction bending becomes the right call. Knowing which method suits your project is exactly why early engagement with your bender-roller matters.

BEST FOR: STRUCTURAL SECTIONS, HSS, WIDE FLANGE, CHANNEL, ANGLE, PIPE & TUBE



HSS INDUCTION BENDING

Tight Radii & Large Sections Without Distortion

Induction bending uses a concentrated high-frequency heat band to locally soften the steel at the point of bending, allowing tighter radii with less distortion than cold bending. It's the method of choice for large diameter pipe, heavy wall sections, and applications where a tighter radius is required than cold bending can achieve. Kubes Steel runs induction bending to 30″ diameter with the precision and repeatability that energy and industrial clients demand.

BEST FOR: TIGHT RADII, LARGE DIAMETER PIPE, HEAVY WALL SECTIONS, ENERGY & INDUSTRIAL



PLATE ROLLING

Cylinders, Cones & Curved Plate

Plate rolling forms flat steel plate into cylinders, cones, and curved panels. Used extensively in pressure vessels, tanks, hoppers, architectural cladding, and structural curved plate applications. Kubes Steel rolls plate to virtually any diameter — from tight-radius cylinders to large-diameter shells — in carbon steel, stainless, and aluminum.

BEST FOR: TANKS, VESSELS, ARCHITECTURAL PANELS, CURVED STRUCTURAL PLATE

WHEN TO BRING KUBES STEEL INTO THE DESIGN PROCESS

The best time to contact a bender-roller is **before the drawings are finalized** — not after. Here's why:

✓ We can confirm whether your specified radius is achievable in your chosen section

✓ We can recommend the most cost-effective bending method for your application

✓ We can flag geometry issues before they become costly RFIs or redesigns

✓ We can provide indicative pricing so curved steel can be properly budgeted

✓ We can advise on section selection — sometimes a slight size change opens up better options

This is exactly what Part 3 of this series is about — why calling the roller before you finalize the drawings saves time, money, and engineering revisions. Coming in the next issue.

COMING UP — PART 3 OF 3

Call the Roller Before You Finalize the Drawings

Why early engagement with your bending partner saves time, money, and engineering revisions. The final issue in the Straight Talk on Curved Steel series.

Have a Curved Steel Project Coming Up?

Send us your drawings early and we'll review the geometry with you — no charge, no obligation.

SEND YOUR DRAWINGS →

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