

SOFTTOOL ENGINEERING

Certificate
DC-3
STPS

TRAINING PROGRAM · BENDING · SPECIALIZATION PROGRAM

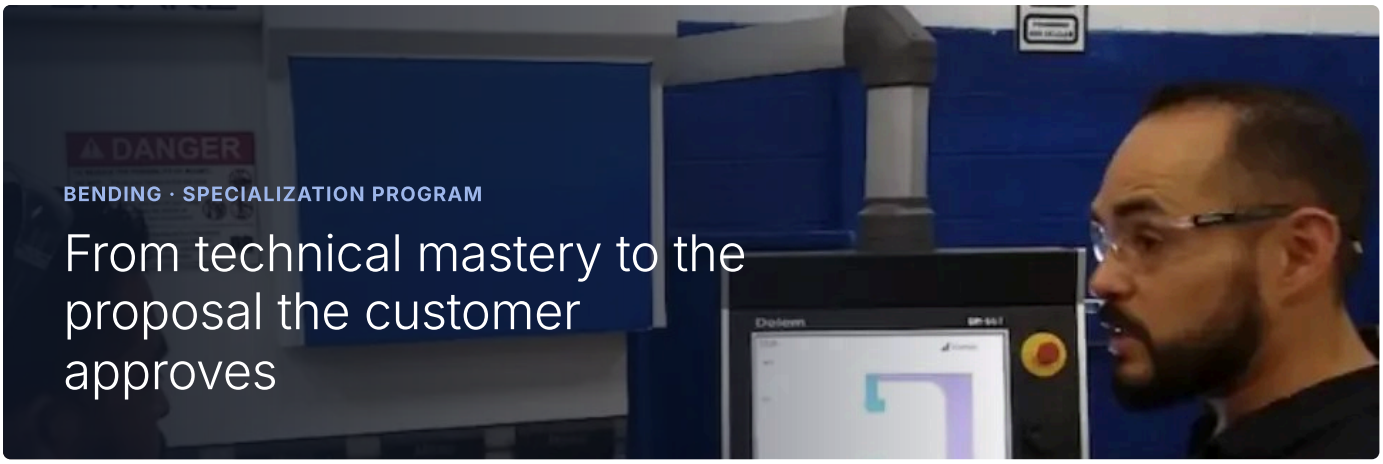
CNC Bending Application Engineer

Technical consultant specialist in bending processes

Two intensive weeks to master CNC bending, diagnose customer problems and propose data-backed solutions.

12	108	80 h	DC-3
modules	topics	duration	STPS certified

Soft Tool Engineering softooling.com info@softooling.com



BENDING · SPECIALIZATION PROGRAM

From technical mastery to the proposal the customer approves

OBJECTIVE

Train application engineers specialized in CNC sheet metal bending who can master the technique, diagnose the root cause of customer problems, propose solutions backed by calculations, advise and close the sale, and provide after-sales support so the customer reaches their goals.

The program is 80% practice and 20% theory, with daily machine labs and real customer cases.

ON COMPLETION, PARTICIPANTS WILL BE ABLE TO

- Technical: explain air bend, bottoming and coining; select tooling; calculate flat patterns and program the machine.
- Technical: design optimal sequences and tell feasible tolerances from impossible ones.
- Diagnosis: ask diagnostic questions, analyze with data and find the root cause.
- Commercial: propose options, calculate ROI, handle objections and close technically.
- Support: understand the machine's logic, train operators and ensure after-sales success.

Course data sheet

DURATION
80 h

INTENDED FOR
Application engineers, technical sales engineers and process specialists

FORMAT
On site, at your plant and with your machinery

APPROACH
Applied theory and machine practice

SCHEDULE
2 weeks, Monday to Friday, 8 h per day

PARTICIPANTS
Maximum 5 per group

REQUIREMENTS
Manufacturing experience and CAD skills

EVALUATION
Theoretical and practical, with results for each participant

CERTIFICATE
DC-3 “CNC bending process training” (STPS) and Application Engineer certificate

EQUIPMENT
CNC press brake with full access

SYLLABUS

Course content

12 modules and 108 topics. The order and depth of each module are adjusted to the machinery and the group's level.

01 Bending fundamentals
02 Materials
03 Tools
04 Machines
05 Drawing development and tolerances
06 Bending sequences
07 Process instructions
08 Set-up and SMED
09 Safety
10 Flat pattern calculations
11 Production engineering
12 Bending consultant

01 Bending fundamentals

1.1 Bending principle
Bending definition · Sheet metal bending · Sheet metal forming · Bending systems

1.2 Bending systems
Air bend · Bottoming · Coining · Forming force diagram · Process variables

02 Materials

2.1 Types of materials
CRS · HRS · Galvanized · Stainless · Aluminum · Copper

2.2 Material handling
Cosmetic care of bent parts · Storage · Preparation before bending

03 Tools

3.1 Types of tools
Punches · Dies · Die calculation and selection · Minimum flange · Tool styles

3.2 Tool design
Prototype tools · Bending set-up design · Tool quotation · Go / no-go gauges · Air offsets · Coining to coining · Large radii to coining · Large radii with step bending · Height analysis

3.3 Materials and treatments
Materials for bending tools · Heat treatments · Cosmetic classes

04 Machines

4.1 Description of press brakes
Types and parts of a CNC press brake · RAM, back gauges and axes · Controller and safety light curtains · Automated and semi-automated machines

4.2 Selection and maintenance
Press brake selection · Maintenance · Control panel

4.3 Programming modes
Angle mode (automatic) · Depth mode (absolute) · Variables: material, thickness, V, radius, angle, length, distance, speed, RAM opening, pinch point

05 Drawing development and tolerances

5.1 Drawing development
Developing drawings and bending drawings · Details and sections on bent parts

5.2 Tolerances
Bending tolerances · GD&T on bending drawings

06 Bending sequences

6.1 Sequence analysis
Unfolding sheet metal parts · Optimal bending sequence · Sequence constraints · Position according to the tool · OPEN / EOP / EOD / IP / ID / SP modes

6.2 Sequence execution
Turning parts · Material entry and exit · Sequences with offline software

07 Process instructions

7.1 MPI and procedures
Developing bending MPIs · Bending direction · Visual aids · Set-up and cycle times · Bending rates

7.2 Documentation
Written procedures · Visual guides · Parameter control

08 Set-up and SMED

8.1 Set-up
Set-up variables · Tool arrangement · Height compensation · Bending flow

8.2 SMED
Internal and external activities · Standardizing variables · Types of SMED (mobile, fixed) · Designing standard arrangements

09 Safety

9.1 Personal protective equipment

9.2 Part holding methods

9.3 Hand care

9.4 Tool mounting

9.5 Working together

9.6 Safety light curtains

9.7 Material handling

10 Flat pattern calculations

10.1 Fundamentals
Types of deformation · Bend deduction, bend allowance and K factor · Neutral axis

10.2 Practical calculations
Flat patterns with bend deduction and with bend allowance · Locating the K factor · Hems and offset bends · Flat pattern review

11 Production engineering

11.1 Teamwork
Teamwork in bending

11.2 Analysis tools
Production engineering of bent parts · DFM · FMEA · Control plan · PDCA · Root cause: Ishikawa and 5 whys

12 Bending consultant

12.1 Consulting methodology
Customer baseline · Identifying the problem and its root cause · Supported technical proposal · Loyalty through knowledge

12.2 Assessment
Active listening · Diagnostic questions · Data collection and analysis

12.3 Proposal
Proposal structure · ROI calculation · Three solution options · Technical presentation

12.4 Closing and support
Technical closing and objection handling · After-sales support · Customer success

METHODOLOGY

A specialization program, not a classroom course

01	02	03	04	05
80% practice	**Real cases**	**Group work**	**Mentoring**	**Panel evaluation**
Learning based on real cases and machine labs.	Customer situations to diagnose and solve.	Peer collaboration and feedback.	Instructor available throughout the program.	Proposal and capstone project with a real case.

Week 1 · Technical fundamentals

Day 1	**Bending fundamentals**	Lab: variables on the machine
Day 2	**Materials**	Lab: behavior of each material
Day 3	**Tools**	Lab: tooling selection and offsets
Day 4	**CNC machines**	Lab: operation and programming
Day 5	**Calculations and sequences**	Lab: flat patterns and sequences

Week 2 · Application and consulting

Day 6	**Process instructions and set-up**	Lab: MPI and changeover reduction
Day 7	**Advanced flat pattern calculation**	Lab: validate flat patterns on the machine
Day 8	**Consultant: diagnosis**	Lab: 10 customer cases
Day 9	**Consultant: proposal and closing**	Lab: 2 complete proposals
Day 10	**Integration and certification**	Final evaluation and capstone project

Final evaluation

1. Technical test: flat pattern calculations (3 cases)
2. Diagnostic test: 5 customer cases
3. Two complete proposals with ROI
4. Proposal presentation before a panel
5. Capstone project with a real case

Passing criteria

- Attendance above 90%
- Correct diagnosis above 80%
- Technically feasible proposals
- Approved capstone project

Includes

- 80 hours of training
- Flat pattern calculation software
- Soft Tool Engineering bending tool profiles
- DC-3 certificate and program certificate



INSTRUCTORS

People who started on the shop floor

More than 20 years in sheet metal fabrication: cutting, punching, bending and welding at manufacturing companies. The Soft Tool Engineering team also authored technical books on cost engineering and flat pattern development that are used as support material.

Schedule

Monday to Friday, 8:00 to 12:00 and 13:00 to 17:00. Mornings for theory and cases; afternoons for labs.

SOFTTOOL ENGINEERING

TRAINING PROGRAM

Bring this course to your plant

Send us your machinery, the materials you process and the number of participants. We'll propose the program, duration and dates.

EMAIL

info@softooling.com

WEBSITE

softooling.com

OTHER COURSES

Sheet and tube laser cutting · Complete laser cutting process · Complete CNC punching process · CNC sheet metal bending processes · Sheet metal flat pattern calculation · Blueprint reading · Expert programmer for cutting processes · Sheet metal process expert · Sheet metal cost engineering · Welding training · Fiber laser welding · Laser Welding Application Engineer

Content can be adjusted to the machinery and the group's level. Images for reference only.