Shearing – Course: Technique of Working Sheet Metals, Pipes and Sections. Instruction Examples for Practical Vocational Training

Table of Contents

Shearing – Course: Technique of Working Sheet Metals, Pipes and Sections. Instruction Examples for Practical Vocational Training

Institut für berufliche Entwicklung e.V.
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Author: B. Zierenberg

Institut für berufliche Entwicklung e.V.
Parkstraße 23
13187 Berlin

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Preliminary Remarks

The present documentation contains 5 selected instruction examples, with which shearing of sheet metals and sections can be practised with different tools.

In this connection, straight–lined and curve–shaped cuts are to be performed on sheet metals as well as parts are to be sheared off angular, round and flat sections (angles, rounds, flats).

These practising pieces, after being continued to be worked on, will become tools to be used by glaziers, roofers and bricklayers, and a stable hinge–joint is produced, finding its practical use, too.

To facilitate the preparation and execution of work, the materials, tools, measuring and testing means as well as auxiliaries necessary for each instruction example are stated. Moreover, the previous knowledge required to implement the practical exercises is mentioned.

With the help of the working drawing and the corresponding sequence of operations the exercise can be carried out independently.

Instruction Example 13.1. Smoother and Putty Knife

Practising the shearing of thin sheet metal with tinners’ snip and tinners’ through snip.

Material

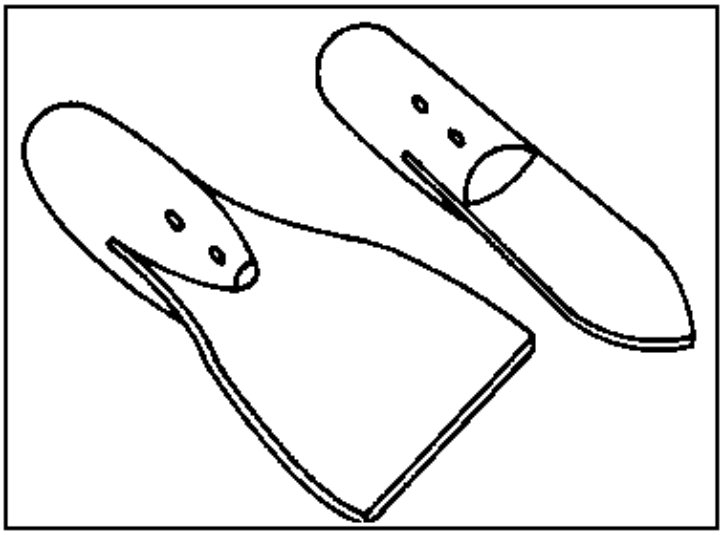
– sheet steel (420 MPa) (1)

thickness: 0.7 mm
width: 35 mm
length: 140 mm

– sheet steel (420 MPa) (2)

thickness: 0.7 mm
width: 100 mm
length: 140 mm

– wooden handle, rivet



Tools

Tinners' snip, tinners' through snip, steel scriber, smoothing file 200 mm (flat), aluminium hammer

Measuring and testing means

Steel rule, measuring tape curved templet

Auxiliary accessories

Vice, surface plate

Previous knowledge required

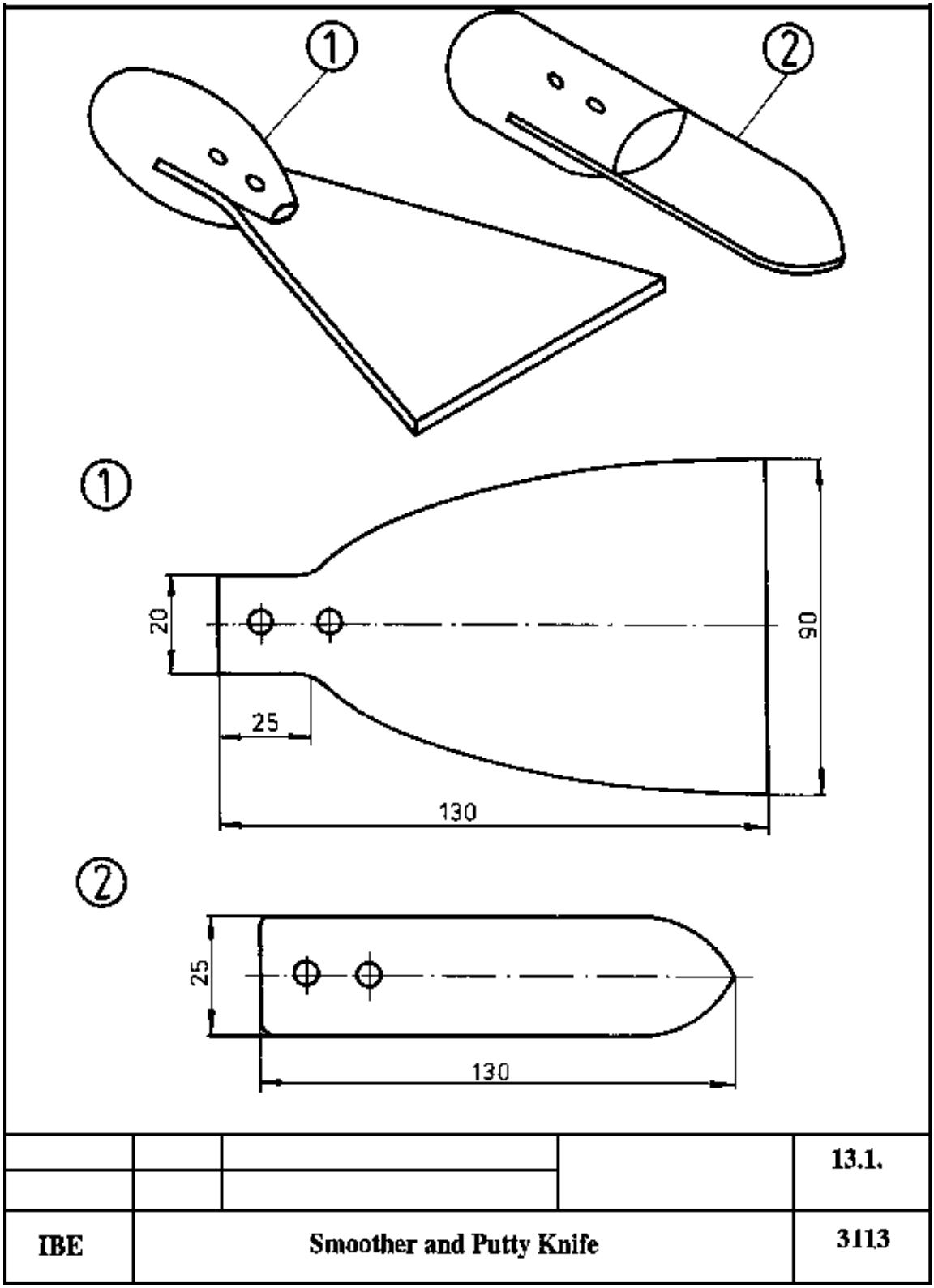
Manual working of materials – measuring, testing, scribing, filing, straightening

Sequence of operations	**Comments**
1. Preparing the workplace Making the working material available	– Check completeness
2. Checking evenness of sheet metal plates	– Straighten, if required
3. Scribing the workpiece (1) and (2) proceeding from centre line	– Scribe curved lines with any curved templet you choose
4. Shearing the workpiece (1) with tinners' snip: – cut to length – cut in handle side 25 nun from left – cut in blade side from right up to handle side	– Immediately put waste material into waste container. – Put workpiece aside.
5. Shearing the workpiece (2) with tinners' through snip: – cut to length – cut longitudinal edges – cut out curved tip	

6. Straightening and de−burring the workpieces (1) and (2)	– Aluminium hammer
7. Checking the workpieces	– Accurate−to−size edges of cut – Uniform cut

Completion:

Chamfering the workpiece edges slightly, fitting and slipping on the wooden handle, drilling and riveting both.



Smoother and Putty Knife

Instruction Example 13.2. Roof Tiler Trowel

Practising the shearing of thin sheet metals with the curve shear.

Material

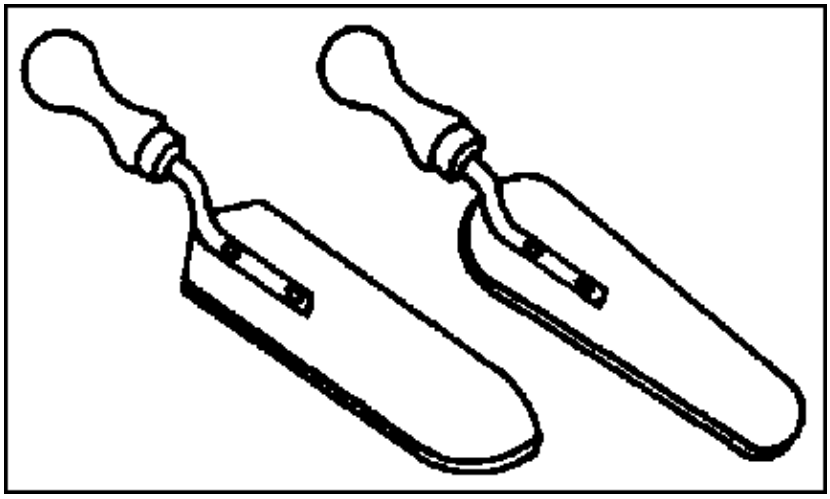
– sheet steel (500 MPa)(1)

thickness: 2 mm
width: 70 mm
length: 230 mm

– sheet steel (500 MPa) (2)

thickness: 2 mm
width: 80 mm
length: 200 mm

– wooden handles with tang



Tools

Curve shear, steel scriber, divider, smoothing file 200 mm (flat), aluminium hammer

Measuring and testing means

Steel rule, measuring tape

Auxiliary accessories

Vice, surface Plate

Previous knowledge required

Manual working of materials–measuring, testing, scribing, filing, straightening

Sequence of operations	**Comments**
1. Preparing the workplace Making the working material available	– Check completeness
2. Checking planesess of sheet metal plates	– Straighten, if required
3. Scribing the workpieces (1) and (2)	– Proceed from centre line
4. Cut out workpiece (1) with curve shear.	– Turn workpiece at curved lines

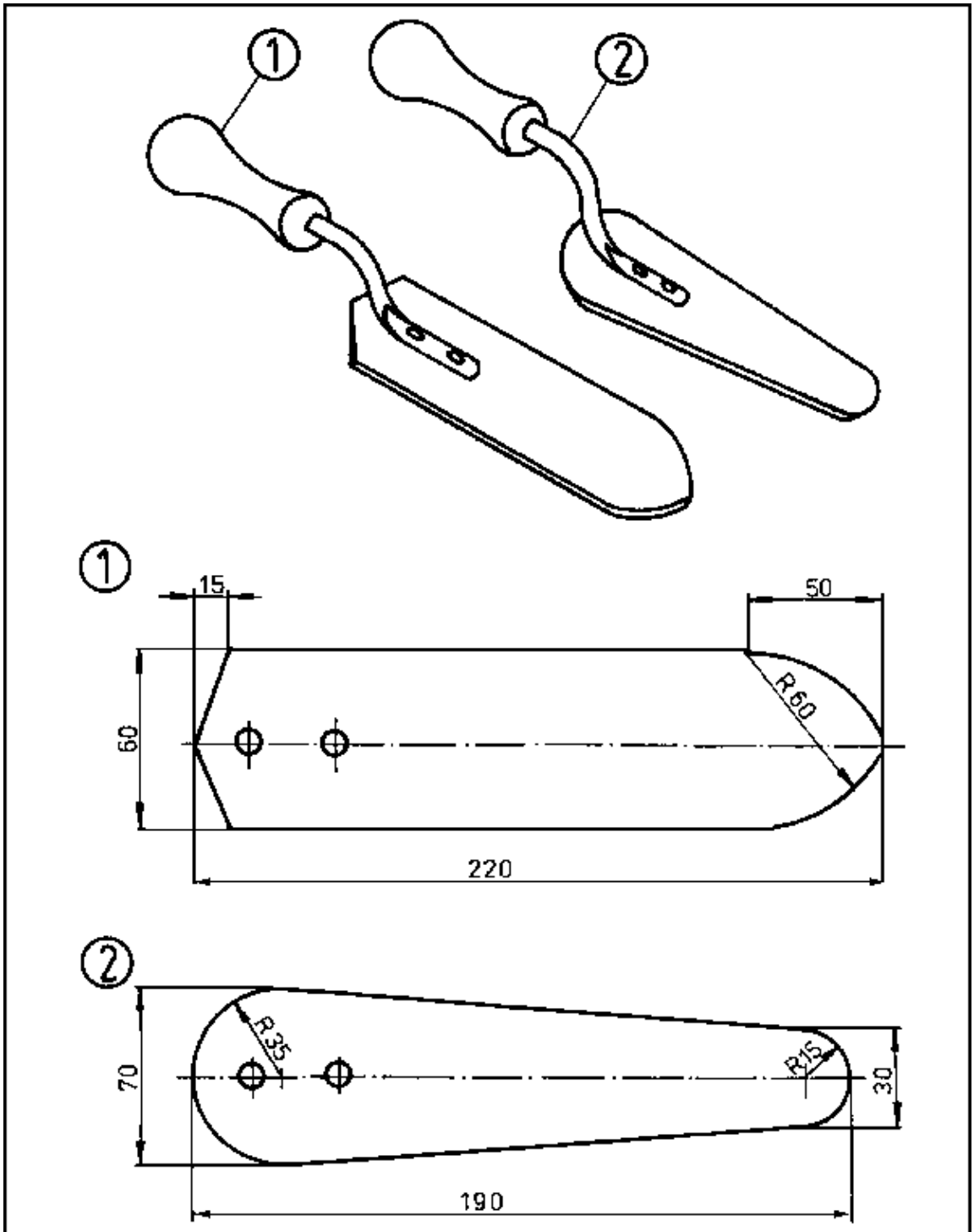
5. Cut out workpiece (2) with curve shear.

6. Straightening and de−burring workpieces (1) and (2) – Aluminium hammer

7. Checking the workpieces – Accurate−to−size edges of cut
– Uniform cut, no shoulders

Completion:

Chamfering workpiece edges, fitting and mounting wooden handles, with tang (by riveting or welding)



Roof Tiler Trowel

Instruction Example 13.3. Smoothing Trowel

Practising the shearing of thin sheet metal with the guillotine machine.

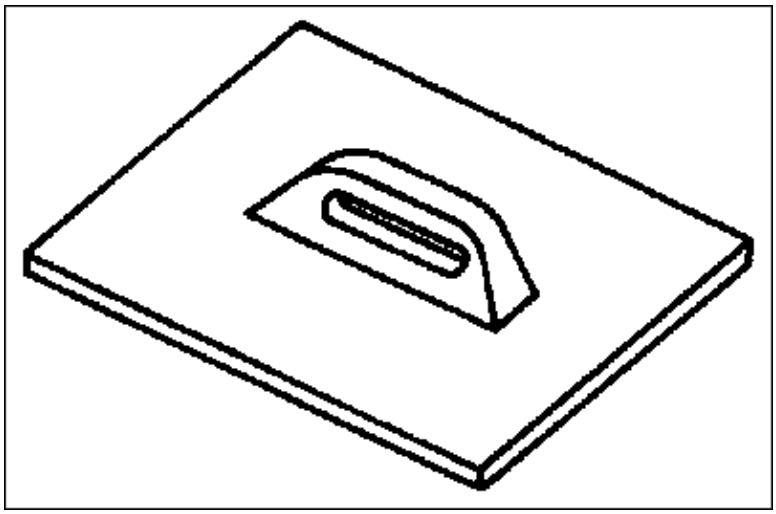
Material

– sheet steel (500 MPa)

thickness: 25 mm
width: 150 mm
length: 300 mm

– wooden handle,

countersunk wood screws



Tools

Guillotine machine, scribing block or steel scriber, smoothing file 250 mm (flat)

Measuring and testing means

Steel rule, measuring tape

Auxiliary accessories

Vice

Previous knowledge required

Manual working of materials – measuring, testing, scribing, filing

Sequence of operations	**Comments**
1. Preparing the workplace Making the working material available	– Check completeness
2. Checking evenness of sheet metal plate and selecting a reference edge	– Straighten and file, required
3. Scribing the workpiece	– Proceed from plane reference edge
4. Putting the sheet metal plate in the guillotine machine, ligning the scribed line to the blade edge of the lower shear knife	– Exactly shove scribed line on blade edge

5. Tightly clamping the sheet metal plate with the locking device

6. Let down the upper shear knife by means of withdrawn hand lever

– Caution!
Do not get jour hands between the shear knives.

7. Release and turn the sheet metal plate.

8. Shearing the other two sides, de–burring all sides subsequently

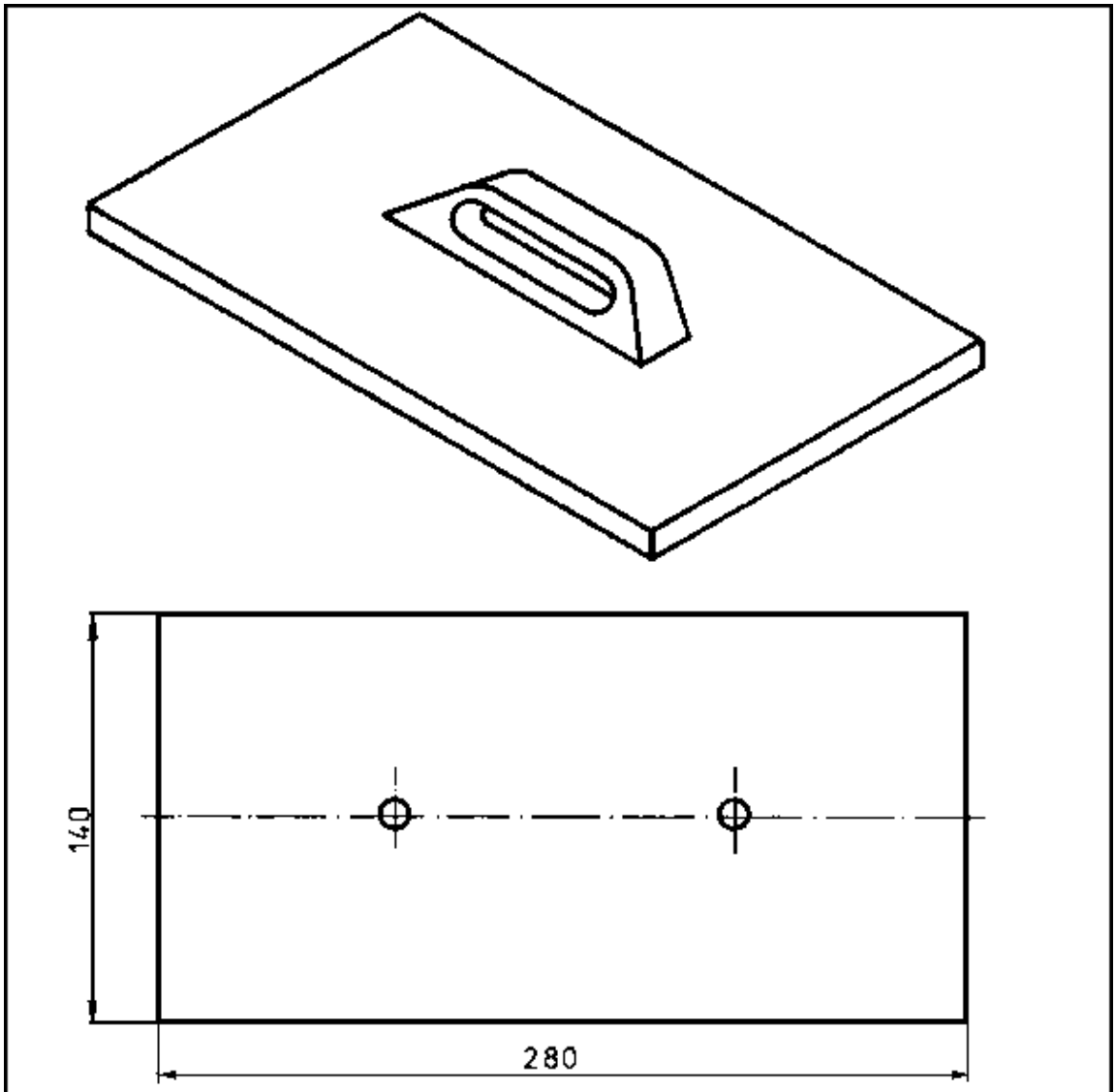
– See operations Nos. 4 to 6

9. Checking the workpiece

– Accuracy to size

Completion:

De–burring the edges, drilling the sheet, mounting the wooden handle with countersunk wood screws.



Smoothing Trowel

Instruction Example 13.4. Brick Trowel

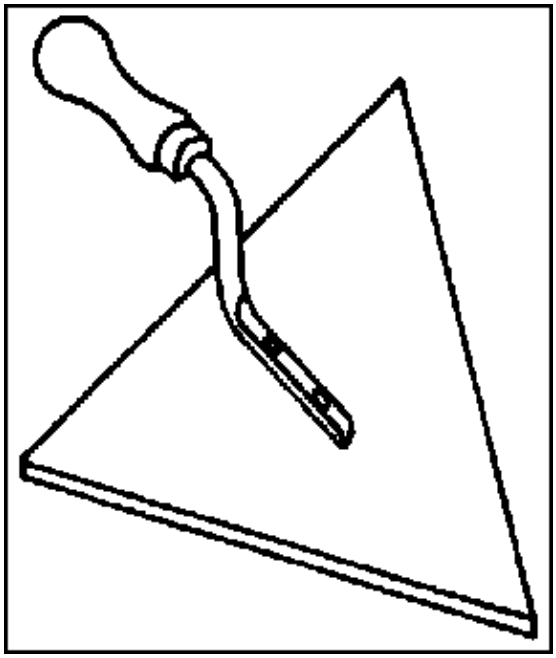
Practising the shearing of thin sheet metal with the lever shear.

Material

– sheet steel (500 MPa)

thickness: 2.5 mm
width: 230 mm
length: 250 mm

– wooden handle with tang



Tools

Lever shear, steel scriber, smoothing file 150 mm (flat), aluminium hammer

Measuring and testing means

Steel rule, measuring tape

Auxiliary accessories

Vice, surface plate

Previous knowledge required

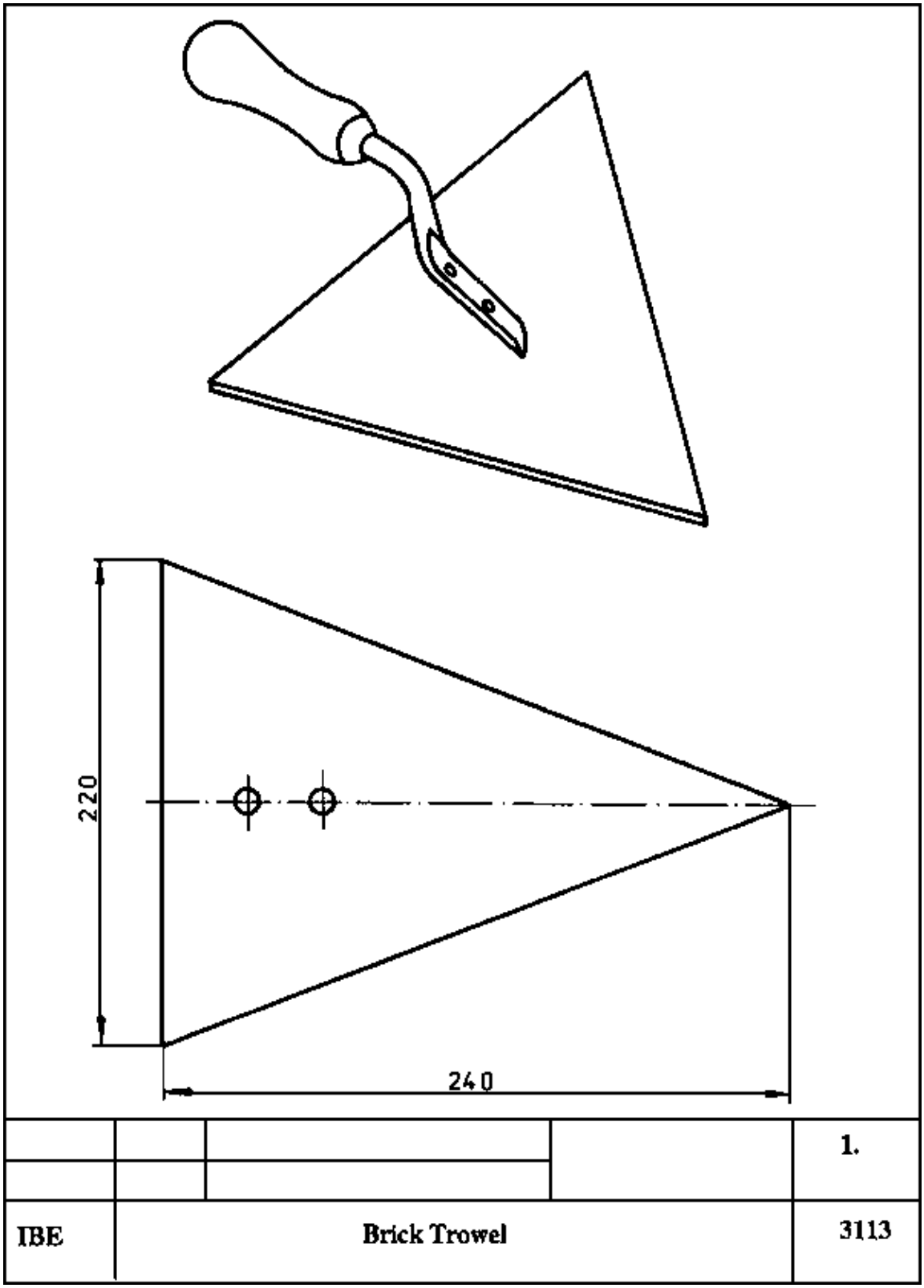
Manual working of materials – measuring, testing, scribing, filing, straightening

Sequence of operations	**Comments**
1. Preparing the workplace Making the working material available	– Check completeness
2. Checking evenness of sheet metal plate	– Straighten, if required
3. Scribing the workpiece	– Proceed from centre line
4. Putting the sheet plate in the lever shear, aligning the scribed line to the lower and upper blade edge	– Exactly shove scribed line on the blade edge
5. Adjusting the blank holder	– Sheet must be in horizontal position

6. Slowly pull down lever and follow up cutting line.	– Do not pull shear knives in one full action, often stop and shove
7. After cutting, shear the other two sides.	– Cf. operations Nos. 4 to 6
8. Straightening and de–burring the workpiece	
9. Checking the workpiece	– Accuracy to size – Uniform cut

Completion:

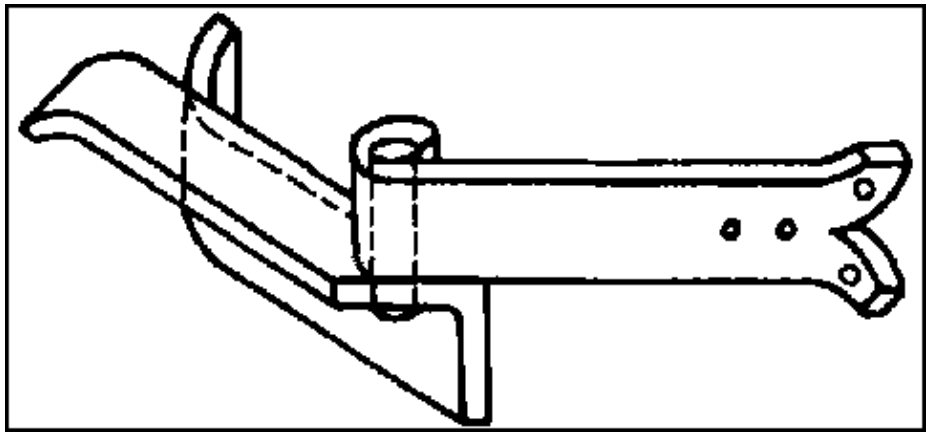
Chamfering workpiece edges slightly, fitting and mounting the wooden handle with tang (riveting or welding).



Brick Trowel

Instruction Example 13.5. Hinge Joint

Practising the shearing of angular, round and flat sections with the lever shear.



Material

– Angles (340 MPa)(1)

thickness: 4 mm
width: 20 x 20 m
length: 130 mm

– Rounds (400 MPa) (2)

diameter: 10 mm
length: 100 mm

– Flats (340 MPa) (3)

thickness: 4 mm
width: 30 mm
length: 300 mm

Tools

Lever shear, steel scriber, bastard cut file 150 mm (flat), engineer's hammer

Measuring and testing means

Steel rule, caliber gauge, measuring tape

Auxiliary accessories

Vice, surface plate

Previous knowledge required

Manual working of materials – measuring, testing, scribing, filing, straightening

Sequence of operations	**Comments**
1. Preparing the workplace Making the working materials available	– Check completeness
2. Checking the initial lengths of individual parts	

3. Scribing the length

4. Shearing the angular section (1) to length on the angular section knife – Align scribed line to upper shear knife.

5. Shearing the round section (2) to length on the round section knife – Shove through in line of sight, from the left.

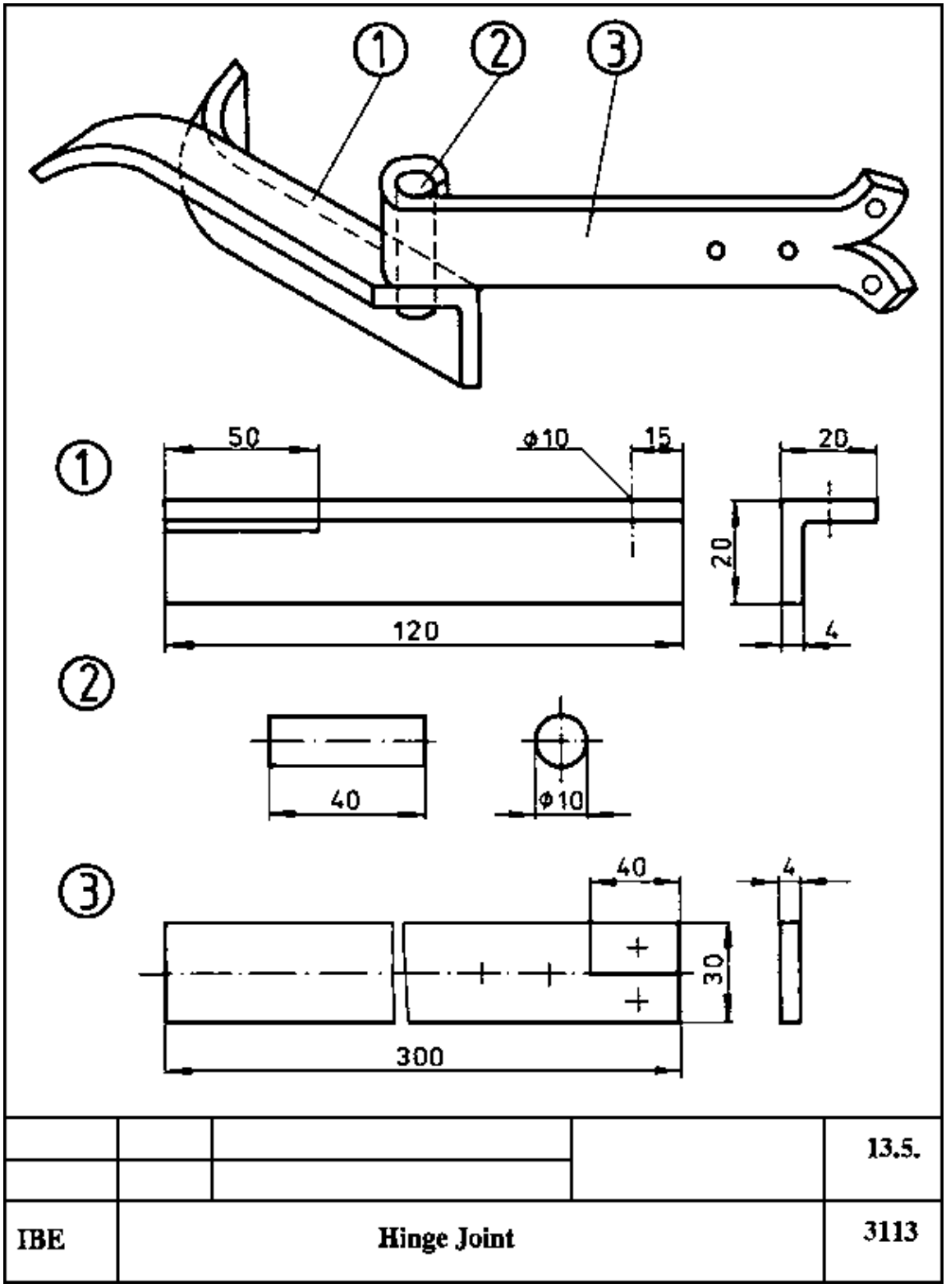
6. Shearing the flat section (3) to length on the angular section knife or on the plane shear knife

7. Straightening and de–burring the individual parts

8. Checking the individual parts – Accuracy to size

Completion:

Making the cuts in the angular and flat sections with the hand hack saw; bending up the cuts with flat chisel and engineer's hammer; drilling the angular and flat sections; bending the eyelet on the flat section; inserting the round section in the bore of the angular section and welding the round section from below.



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Hinge Joint