# Etching for Model Engineers

What you need to know to make your own nameplates etc.

# Topics covered in this session

- Subjects:- Types of plates
- Making artwork Options
- Plate preparation
- Etch resists
- Etching methods and available chemistry
- Final finishing

- Locomotives :
- Name plates ,Makers plates, shed plates, numbers, warning and instruction plates.
- Wagons: Makers plates, loading plates,
- Weight plates, owner plates, repair plates etc.


DUE FOR
PAINT
1962


GREAT NORTHERN RAILWAY Co
No 50 - MAKERS - 1870
DONCASTER


TO CARRY
BUILT. YORK
1920
10 TONS


46441
10J
SC


L&Y Ry. Co. MAKERS
19
HORWICH. 1910.

# Preparing artwork

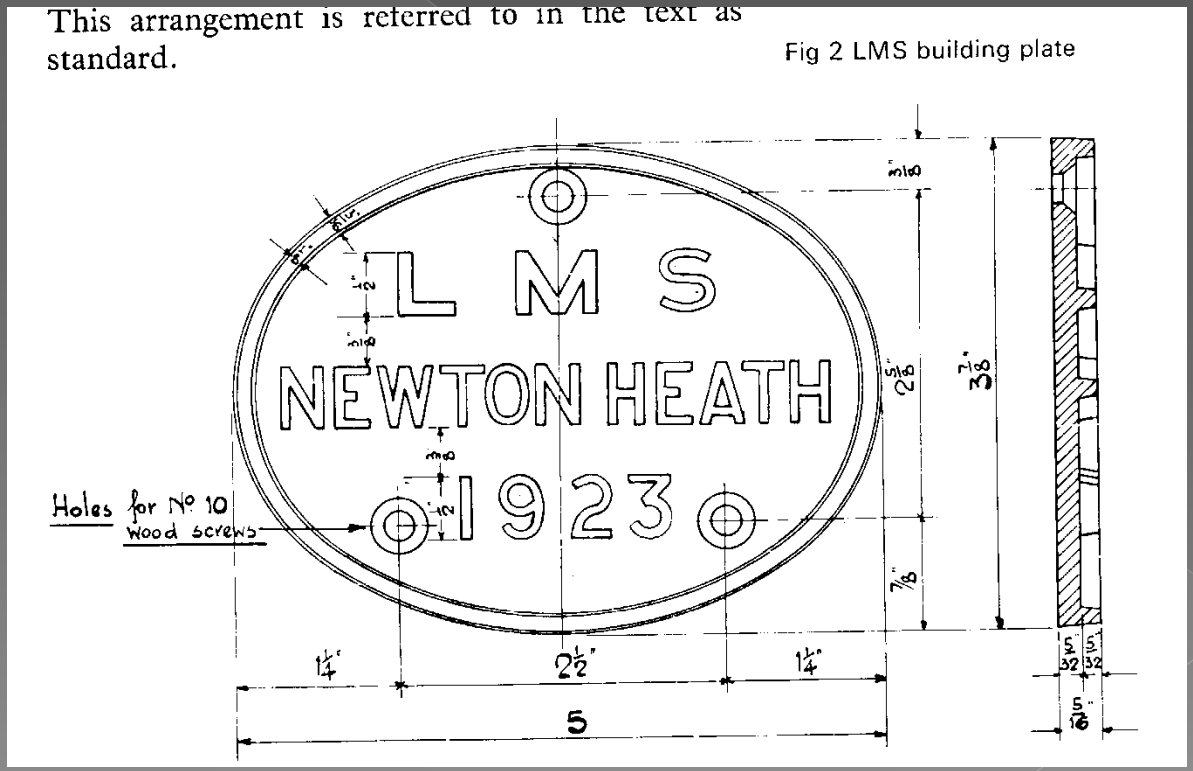
From Drawings sketches

From Photos

*Warning : you do need to be familiar with use of vector drawing packages. Alternative method will be explained later.*

# From drawings

- If you are lucky you can get hold of an original drawing.

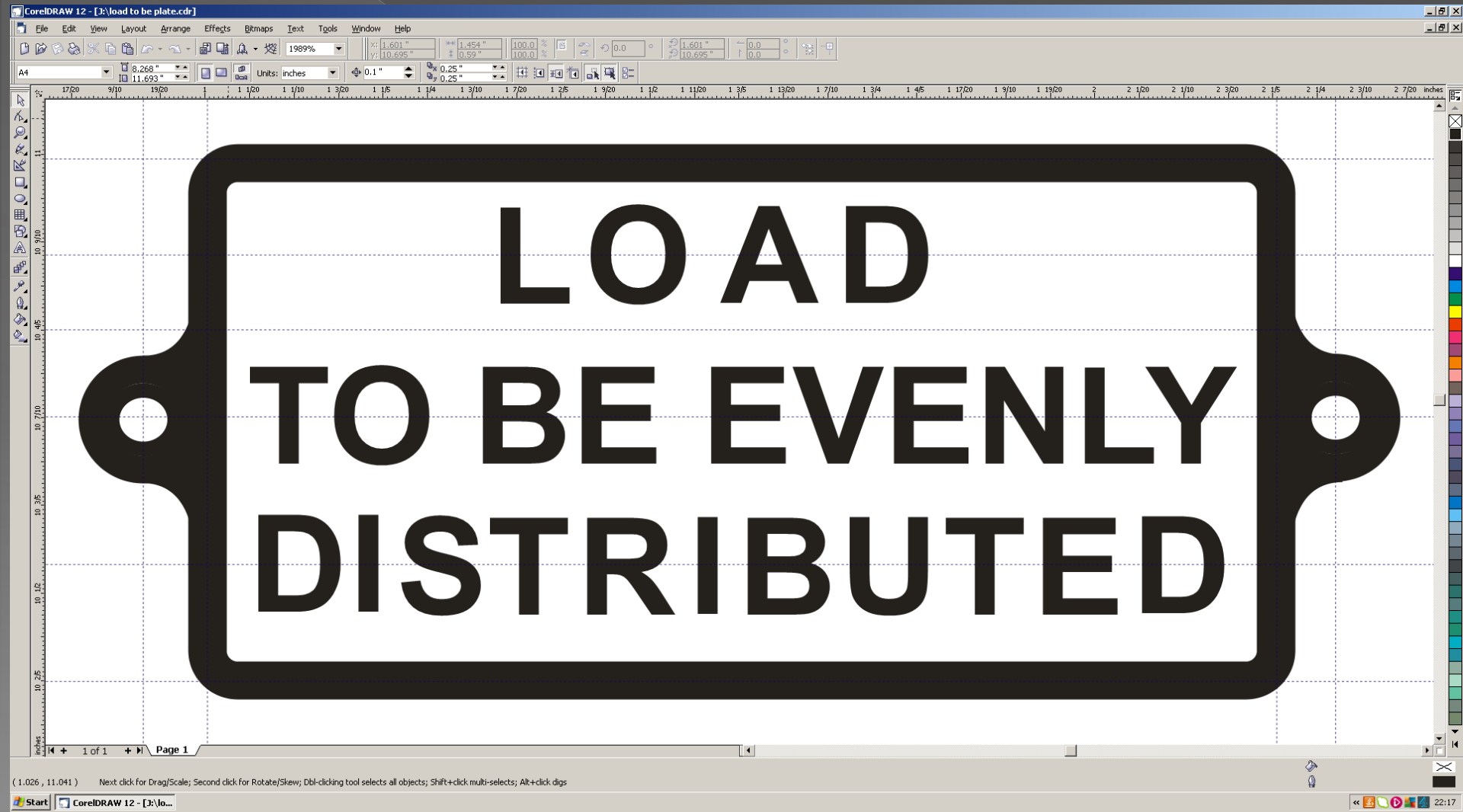


# About Scale

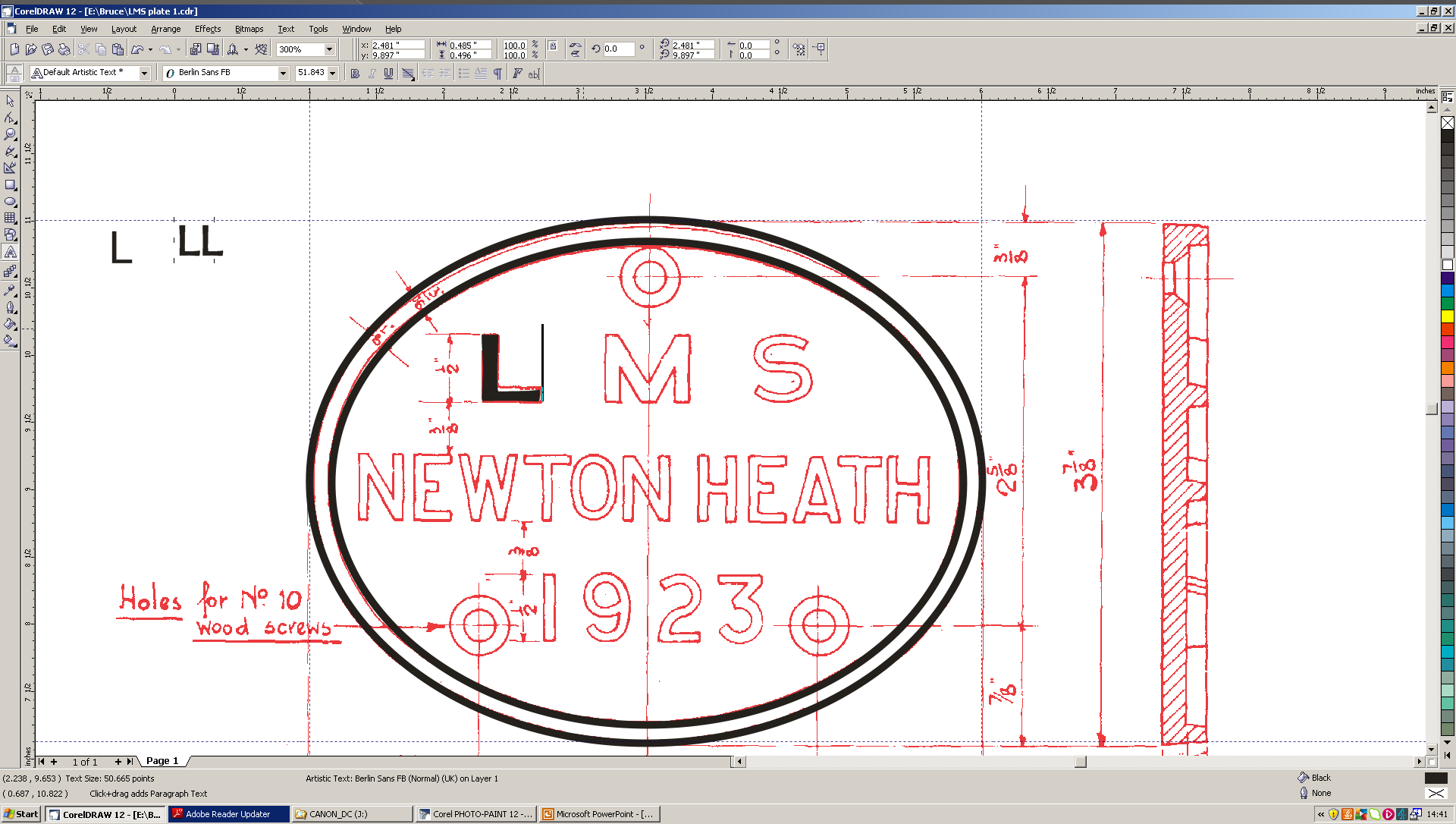
- For 5” models the scale factor works out at .0884 aprox.
- So for 5/32” depth a scale etch will be:
- 5/32*0.0884= 0.0013”
- Most plates are in fact less than 5/32”, brass ones in particular may only 1/16”
- The Newton Heath Plate is only 0.44” across (5” scale)

# Drawn directly

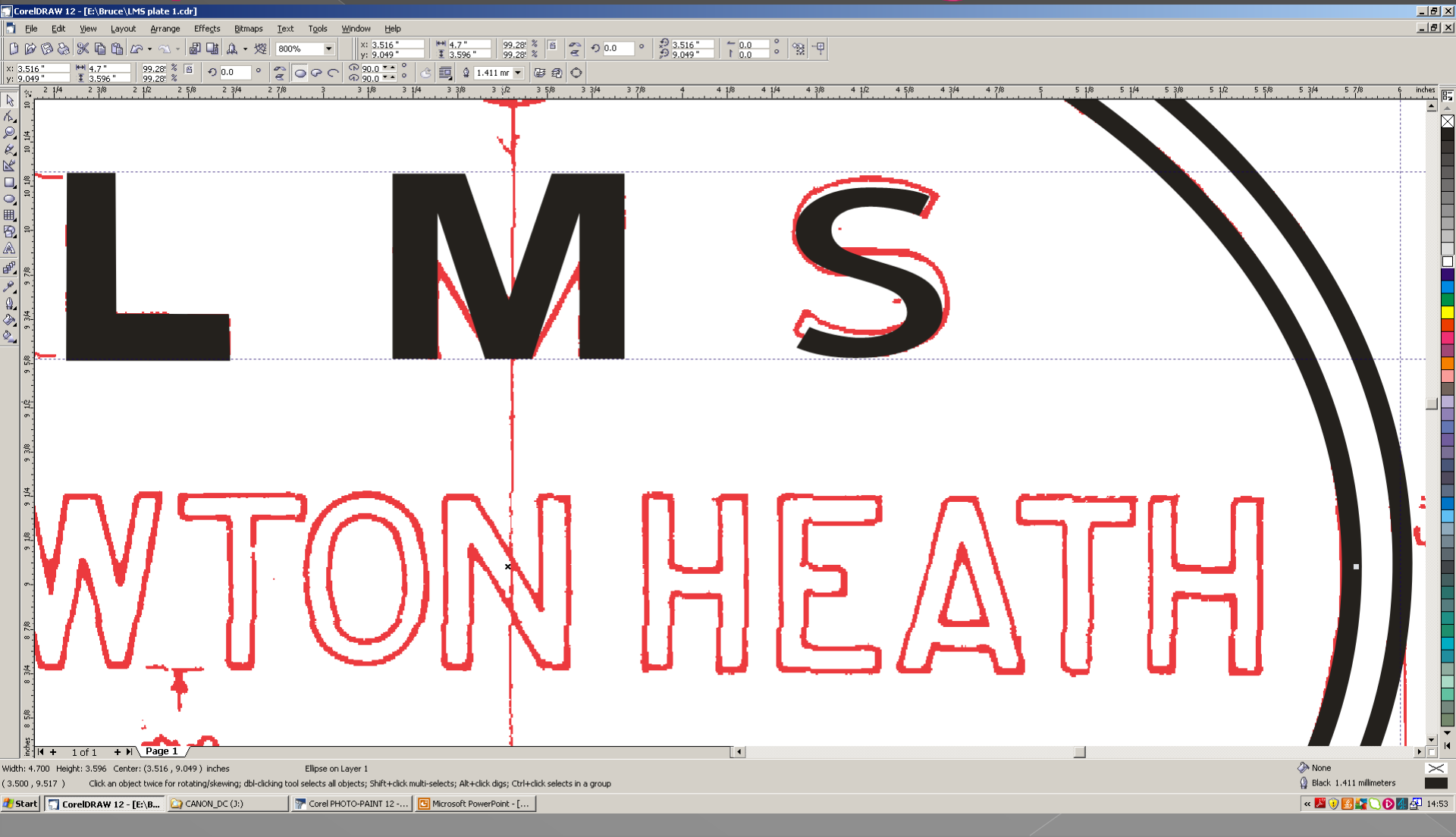
## Many drawing packages will be able to produce such artwork



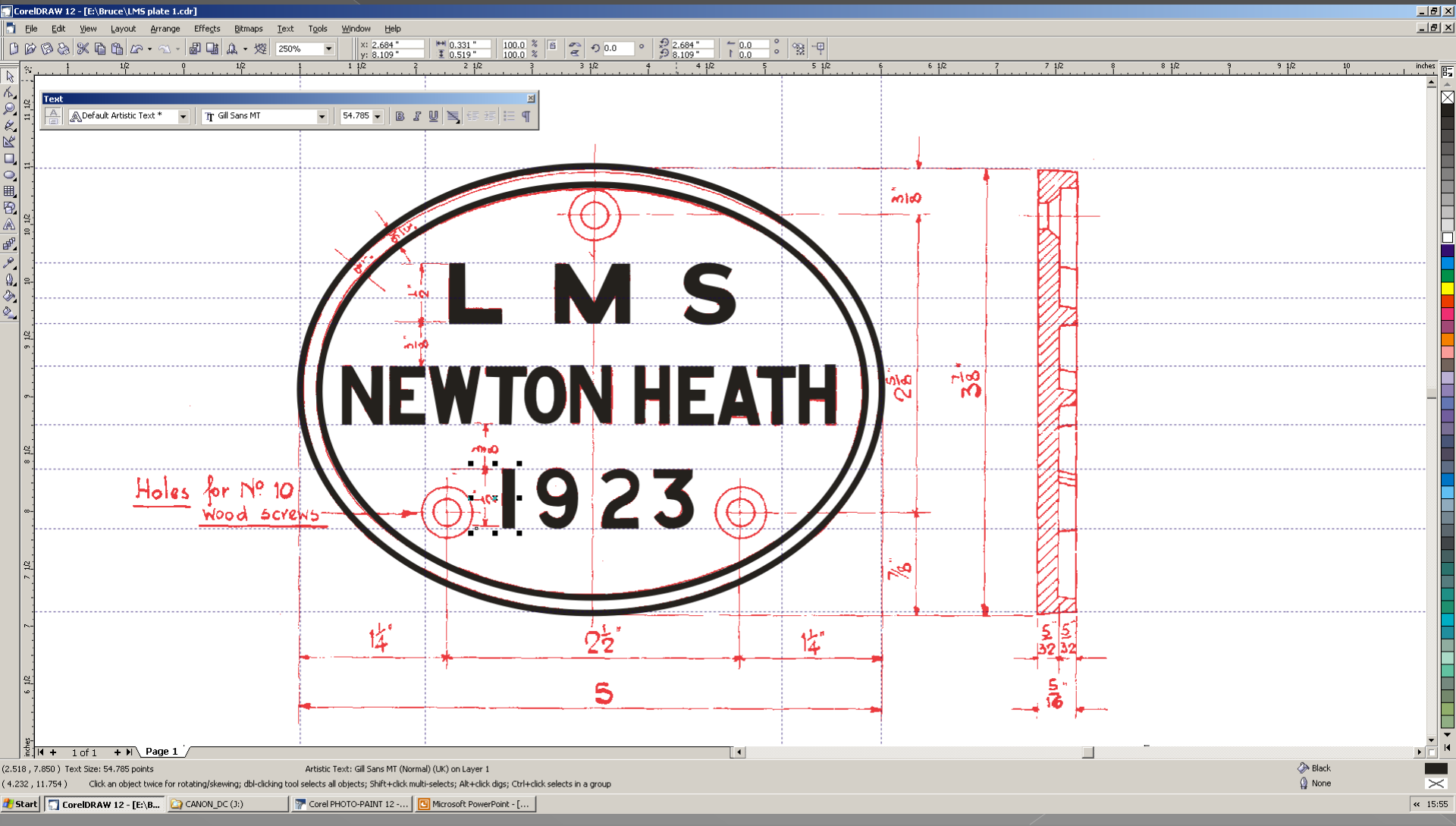
# Load drawing into a layer and change to contrasting colour
# Overdraw as closely as possible



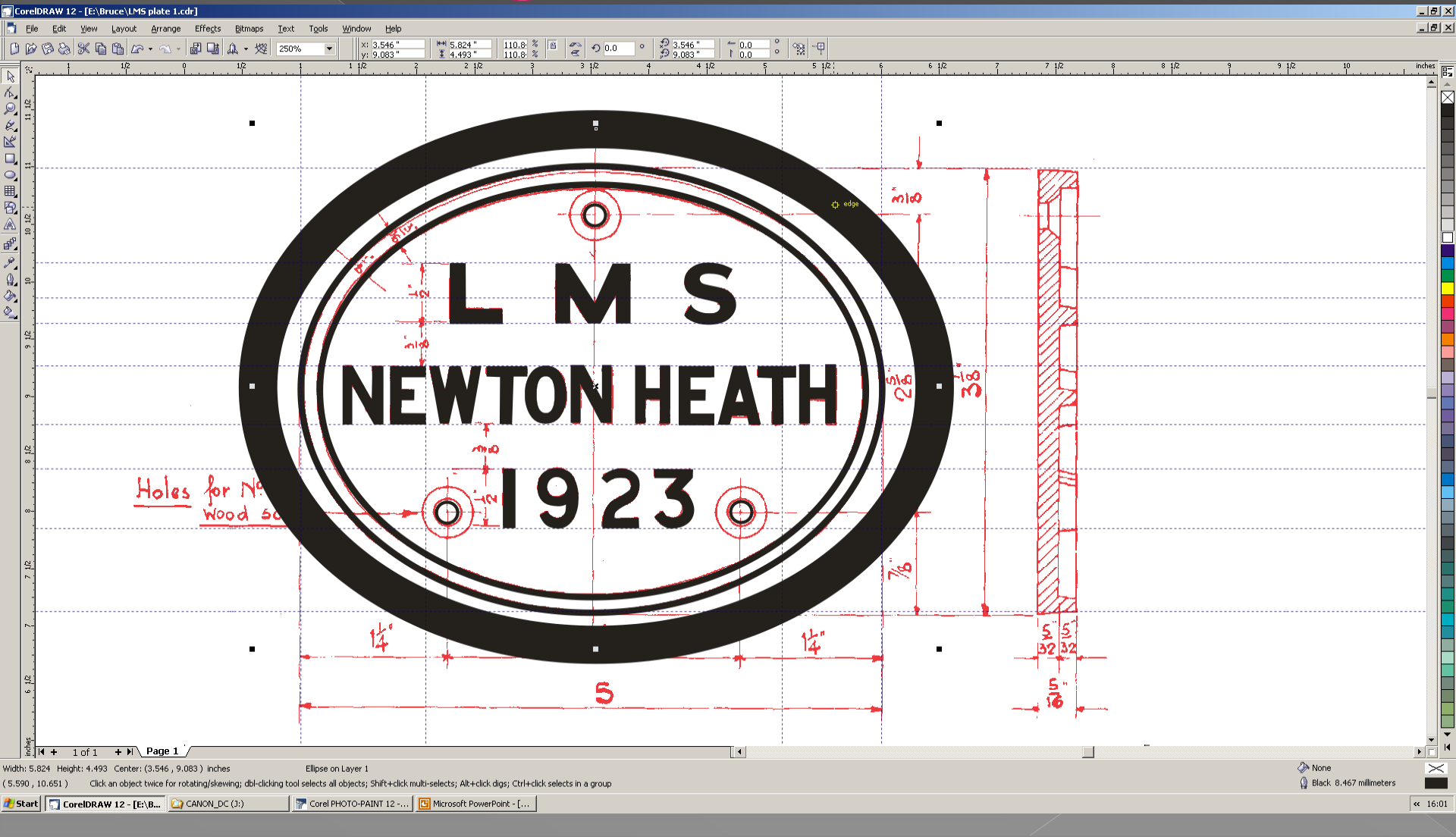
# Select font as close as possible to the origional



# Manipulate drawing to fit template

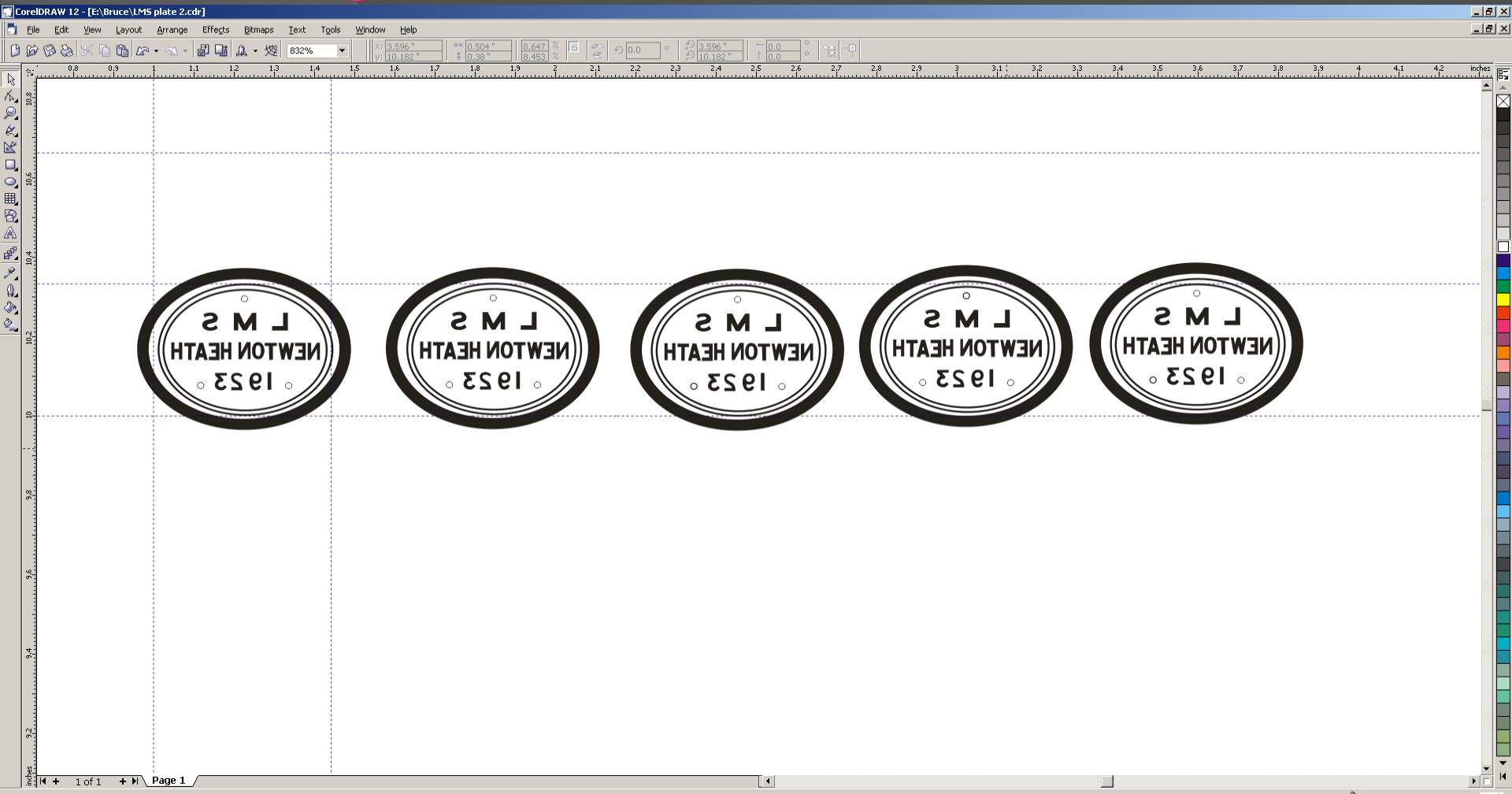


# Add border to assist final trimming

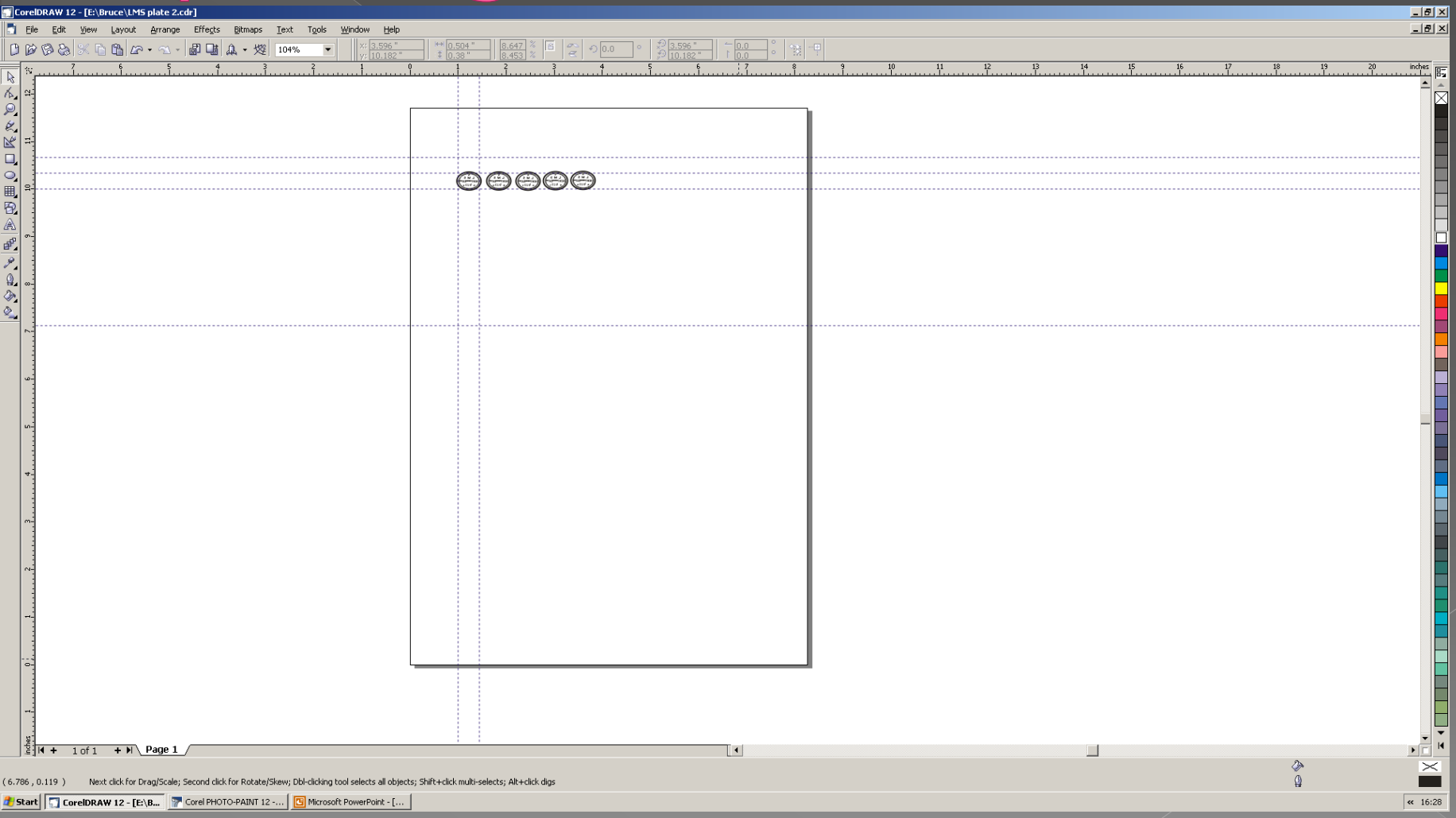


# Remove original layer

# Don’t forget to “mirror image“ and scale to size



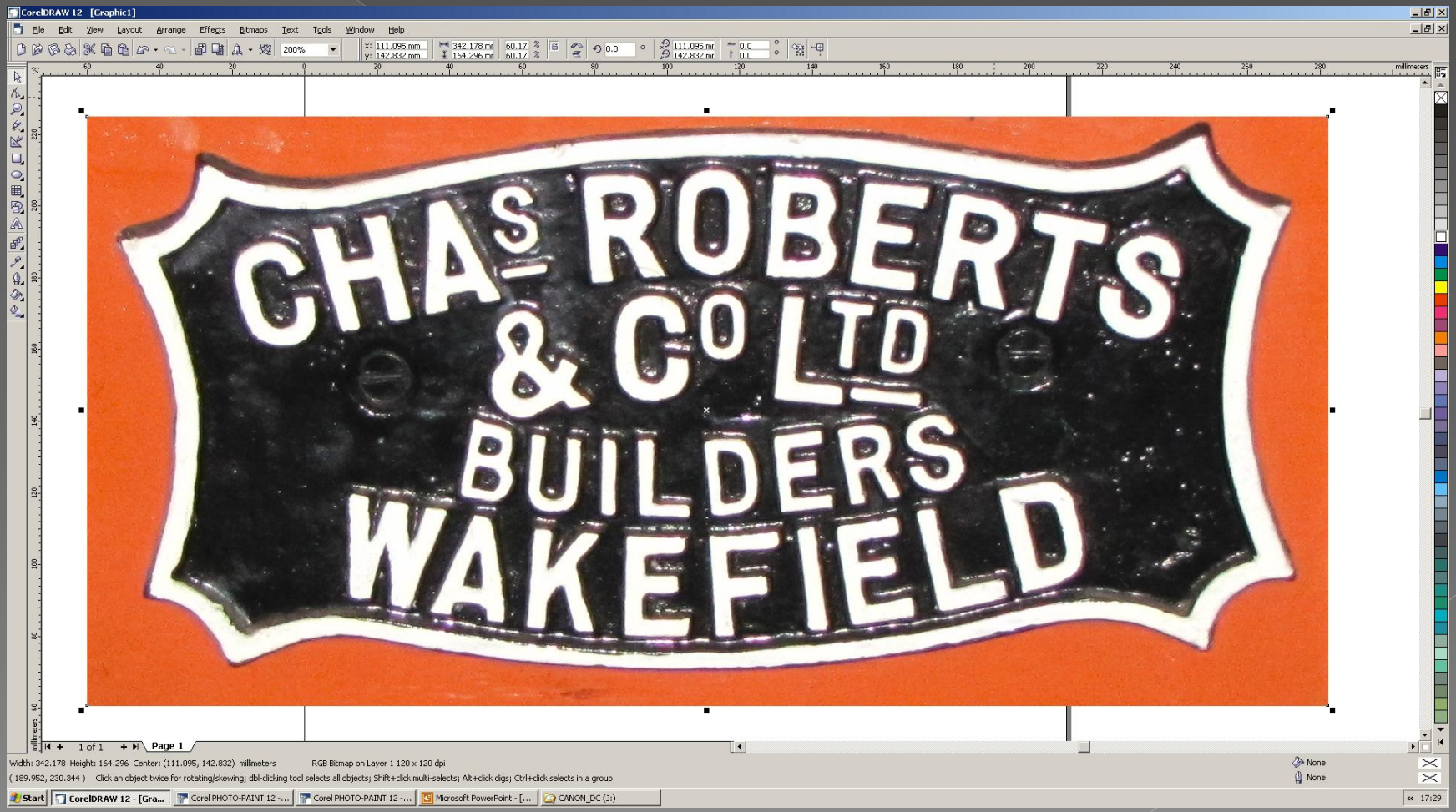
# Final image ready for printing



# From Photograph

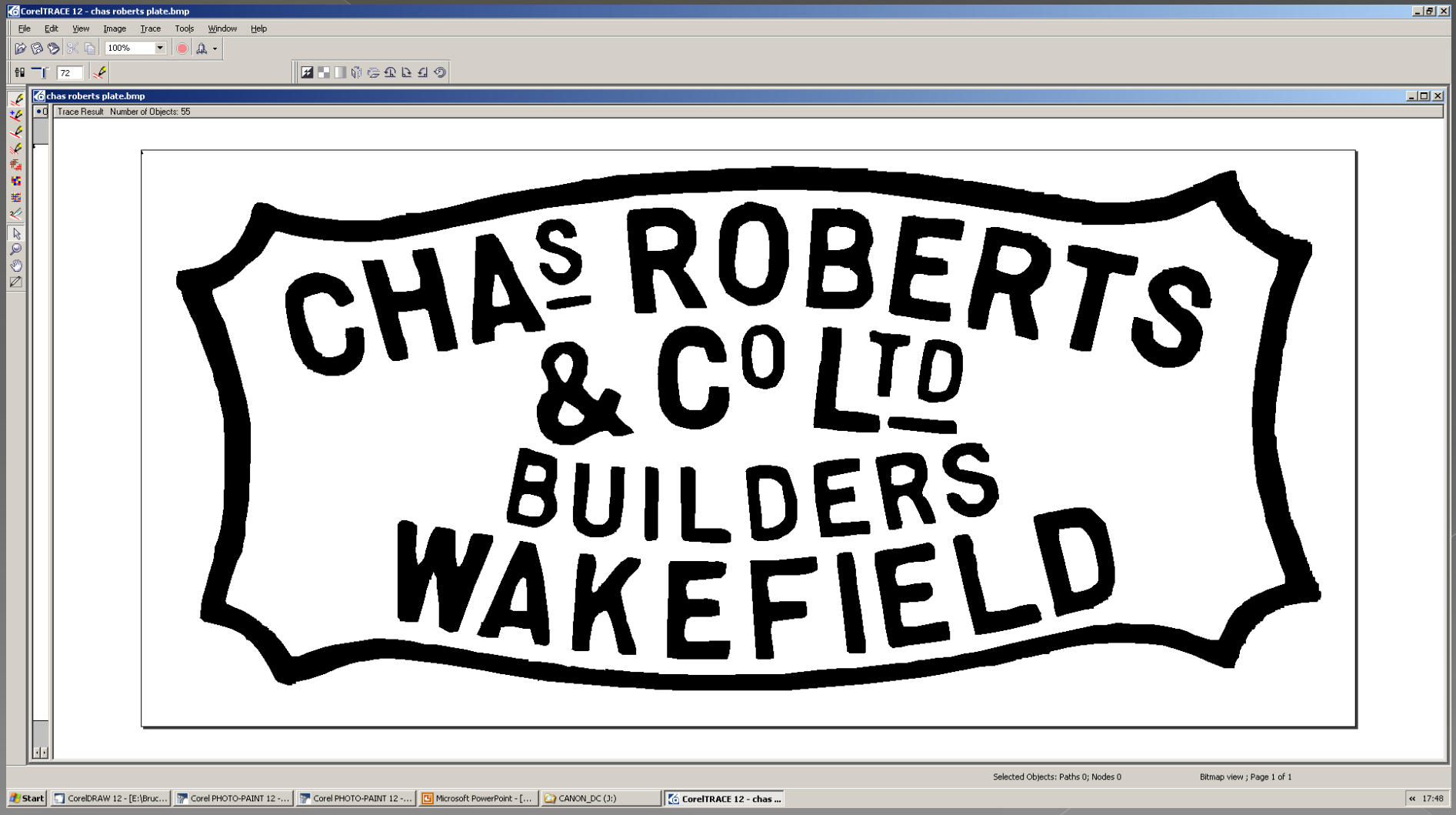
- Select image with good contrast and if possible size reference

# Trim and import to drawing package

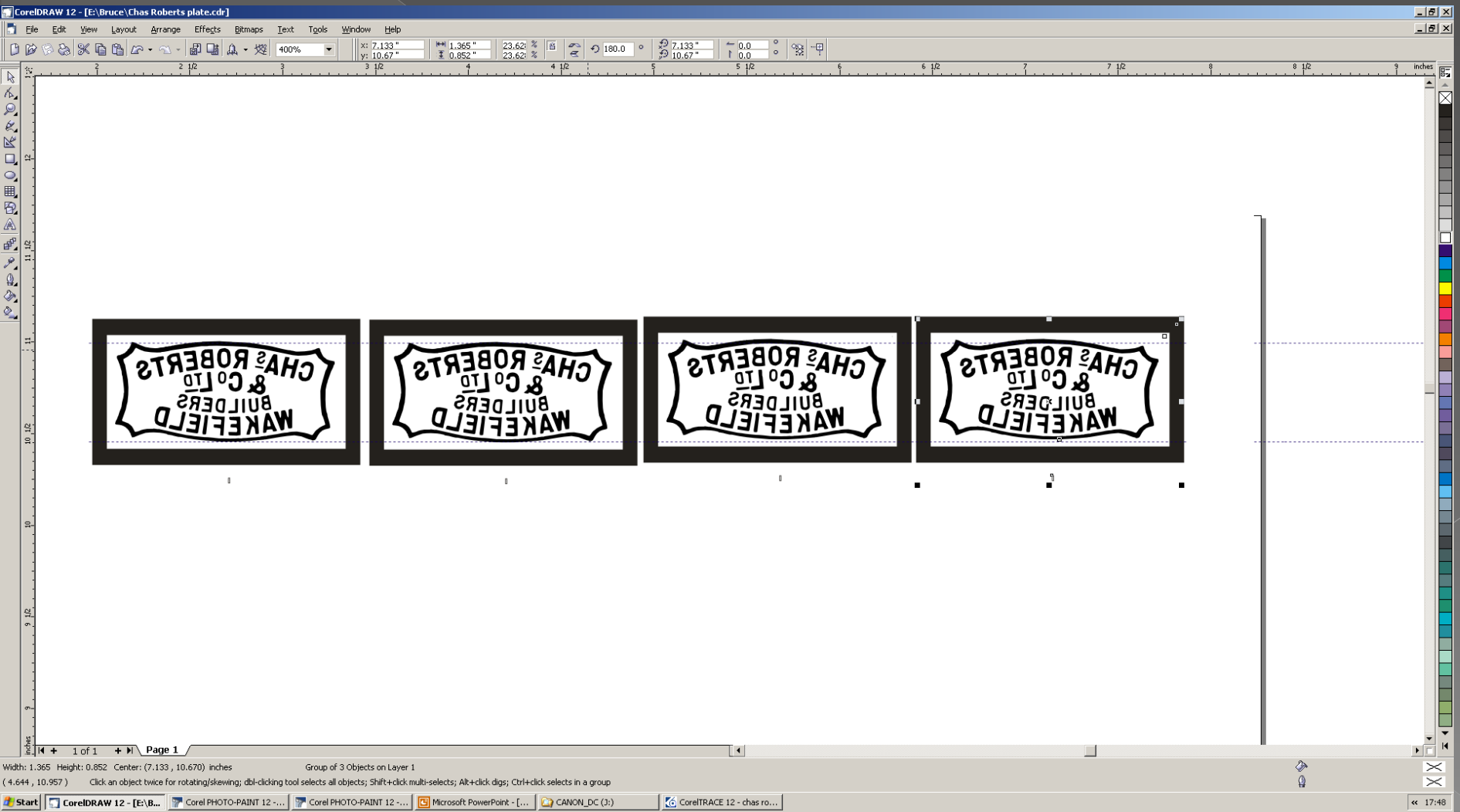


# Run “trace” programme

# Clean up and invert colours



# Add border and flip image



# Plate preparation

- Sample must be very clean.
- Use gloves
- Scrub with abrasives (vim, wire wool. brillo)
- Wet and dry 320  - 800 to remove any deep scratches
- Clean with solvents or better still use an ultrasonic cleaner with dishwasher powder. Rinse with clean water and wipe with iso propyl alcohol. (don’t use meths)

# Etch resists

- Direct transfer “Toner”
- Photo resist film (negative)

# Toner transfer

- Laser printer (photo copier) toner makes a fair etch resist.
- Using Photo Paper  (I've not tried this)
- Using Special transfer paper "Press and Peel"

- Print on paper and transfer with a hot iron.

# Using “Press and Peel”

- Check image is “inside out” make test print on plane paper.
- To make max use of the “press and Peel” arrange to print on bottom of sheet first
- To aid feeding through printer tape paper edge to top of sheet.
- Set printer properties to B&W and dark

CHAS ROBERTS
& CO LTD
BUILDERS
WAKEFIELD

# Reverse image

# The right way round

# Photo Resist

- Traditional method used in industry
- Has used spray on photo resist which is messy and unreliable.
- Photo resist film is now available.  Iron on using domestic iron or laminating machine. (EBAY search “negative photo resist”)
- Requires a negative mask and uv lamp.

# Negative Mask What?

- As this a photographic method you need to prepare a “negative”
- Invert Black-White in drawing package
- Print on overhead film with laser printer or inkjet printer
- You can also make a negative using “letraset” or the like, large drawing and reduce with scanner or photo copier

# Photo Resist - Method -

- Prepare brass plate. Must be very clean
- Apply photo sensitive film as described in instructions (Laminator, domestic iron)
- Work in subdued light
- Expose to UV light. (5 Mins aprox)
- Develop in developer provided.
- Wash and dry ready to etch

# Photo Resist (uv exposure)

# Photo resist (developed image)

# Final inspection and fettling

- Cut to convenient size for etching tank.
- Drill holes at each end
- Paint back and exposed areas
- Leave to dry for 24hrs

*We now have our plates ready to etch*

# Undercutting *Arrh!!!*

- All etchants will undercut to some extent. (literature suggests 10-15%)
- Keep etchant agitated so as to keep fresh chemicals close to surface of plate. (you can overdo this)
- KEEP SOLUTION WARM SO AS TO KEEP ETCHING TIME DOWN.
- Anticipate and make mask bigger.

# Danger Chemicals (corrosive)

- Etching chemicals are generally acidic. Care must be exercised in their use.
- Wear gloves, eye protection and old overalls or better still plastic apron.
- Some solutions emit corrosive fumes which cause metal items to rust. Keep containers closed and avoid over agitation

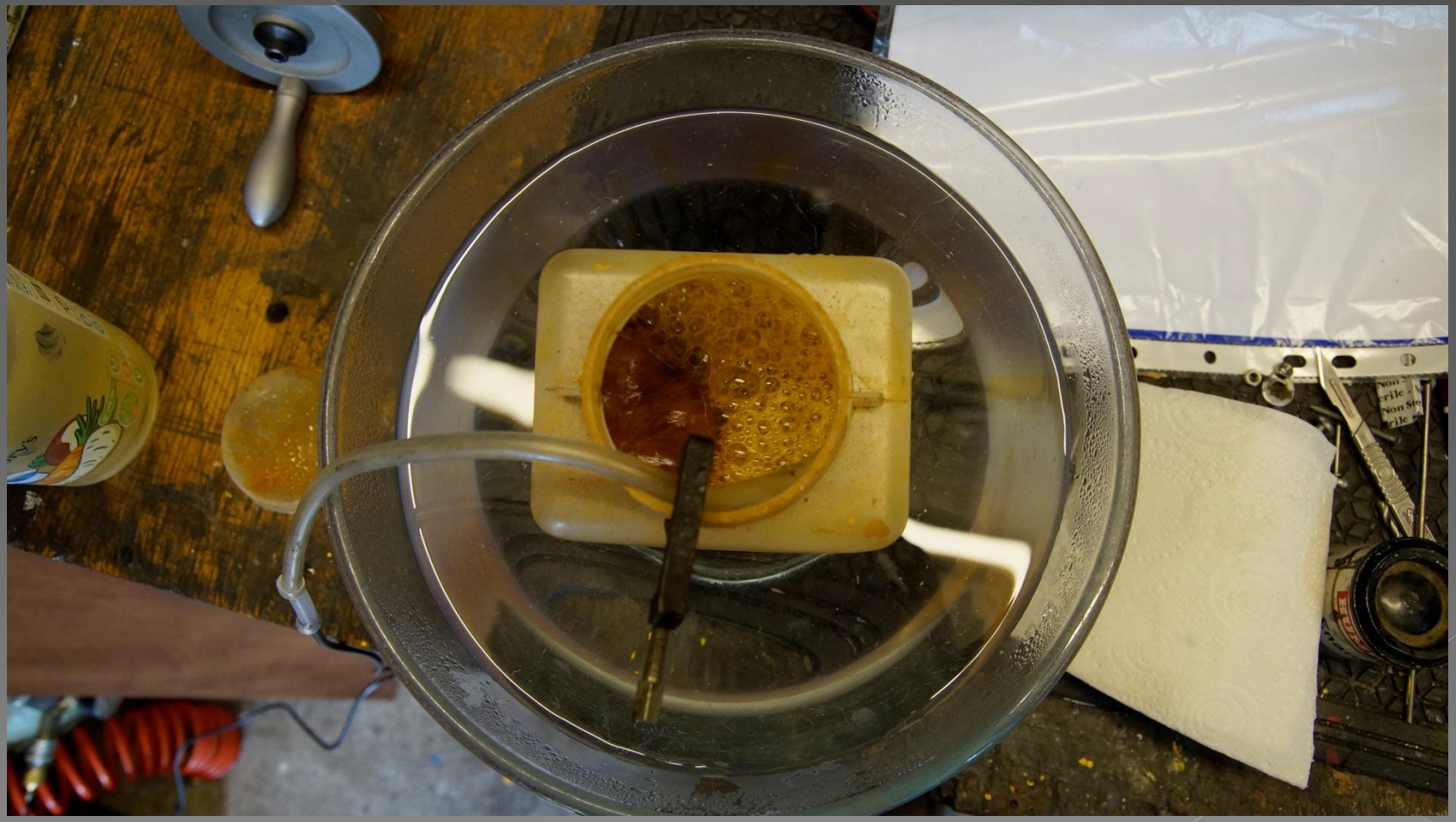
# Etching Chemicals

- Ferric Chloride
- Cupric Chloride (acid solution)
- Ammonium Perchlorate
- Electro etching

# Ferric Chloride (wear gloves)

- The traditional etching solution
- Make up a 25-35% solution. (+ Citric acid optional)
- Etch at 35-40C
- Suspend from edge on stainless wire (vertical)
- Use air agitation using fish tank pump and bubble device
- Etch takes 1-1.5 hrs for 0.015”

# Etching- Ferric Chloride



# Cupric Chloride (Use gloves and mask)

- Extensively used in industry as rapid etchant.
- Difficult to prepare at home
- Strong Acid and Hydrogen Peroxide required.
- Fumes and rusts metal in vicinity (Keep in closed container)
- Works rapidly, produces good etch

# Ammonium Perchlorate

- Make a solution 250gm/l
- Etch at 30-35C
- Agitate with air flow (fish tank pump)
- Clear solution so easy to see.
- Does not attack mask
- Do not keep as chemical degrades
- Theoretically the slowest etchant. (Not so in practice)

# Electro-Etch

- Pass current through electrolyte (copper Sulphate)
- Anode (+) copper sheet
- Cathode (-) plate
- Current flow 500ma  aprox.
- May need experiment.
- Requires Photo resist as toner is conductive and comes off.
- Produces clean etch,

# Finishing -paint?

- Trim to size with file/rotary tool
- Paint as required. (use thin paint Spray)
- Use roller / glass plate to apply detail colour.
- Or polish off paint to reveal brass.

- Fix to model and enjoy your efforts

# Recommendations for beginners

- Use “Press and Seal”
- Etch with Ammonium Perchlorate
- (Ferric Chloride next choice)
- Don’t keep chemicals.
- Be prepared to experiment
- Expect 50% failure rate to start with

# Ref data

- “Press and Peel” www.ronlin.co.uk
- Chemicals/ solvents “APC Pure” www.apcpure.com
- Ferric chloride Search EBAY
- Photo Resist sheet Search EBAY “Negative Photo resist”
- Containers storage Search Ebay “Kartell reagent bottle”
- Ultrasonic tank www.machine-dro.co.uk