

Manta DLG Construction Note and Material List

by Geode Rev. 1.1 5/29/2007*

Manta DLG “generic” plan is free to anyone as long as it’s for non-commercial use. If you feel this is a right model for you and plan to build one, just **PM me [with your email address](#) for un-locked version to print out this full-size PDF plan.**

The full-size PDF file is constructed in a “generic” way that allows you to experiment various combination of building materials and methods. Default is a 4-ch 60” balsa DLG. With minor modification, you can build a two-channel di-hedral or poly-hedral DLG. There is also a “two-section” planform for simpler construction or hot-wire foam core preparation.

Design Considerations

The specific design considerations for the Manta DLG were:

- **Wing Strength** – a combination of re-engineered airfoil (AG45 based), lower aspect ratio wing, and biased Icarex covering to improve bending and torsional wing strength at ~1% penalty in aerodynamic characteristics.
- **High Performance** – a lot of design and construction concepts are heavily influenced by Taboo and SGII. My favorite DLG’s to fly are those below 8.5 oz.. However, this may not be an easy goal for everyone to build a light balsa DLG (at least for me). To maintain the similar handling as Taboo/SGII, wing area is increased to keep the wing loading as low as possible. In general, Manta is geared toward hang-time rather than launch height.
- **Easy to Build** – Wing is conventional D-box construction with only balsa and hardwood (for prototype). Composite materials for localized enhancement are strongly recommended for those who intended to launch at full power. This will also prolong DLG life and delay the balsa fatigue in the long run.
- **Appearance** – the “nature” provides ample examples for color and shapes. This is my favorite reference for model airplane design. Manta DLG is inspired by the underwater glider - the Manta Ray.

Experimentation is also important to Manta DLG design. A Manta DLG can be built out of a lot of configuration and materials. And you don’t need to stick to the 3-view plan – scale it for various size or stretch it for different wing aspect ratio - do whatever you want with it.

Finally, some Ad’s for a non-profit organization

The following RCSD site (<http://www.rcsoaringdigest.com/>) has also helped me in the Manta DLG design. It’s a great digest for free and if you can afford, please do make a donation to this outstanding digest to keep them alive and prosper. Thank you.

* Manta DLG construction notes and plan – for non-commercial use only.

Construction Notes

Vitals

- Wing Span 60 in
- Area 387 sq in
- Load 3.7 oz/sq ft
- Mass (RTF) 9.9 oz / 280 g
 - Wing 5.3 oz / 150 g
 - Fuselage 1.5 oz / 42 g
 - Tail feathers 0.52 oz / 14.7 g
 - Misc 2.6 oz / 73.3 g

1. Manta DLG build thread – <http://www.rcgroups.com/forums/showthread.php?t=688041>
2. Wing mount – see Taboo's wing mount method <http://www.olgol.com/TabooGT/build5.html>
3. Full flying tail - <http://www.rcgroups.com/forums/showpost.php?p=7165783&postcount=114>
4. General construction notes:
 - Taboo construction notes - <http://www.olgol.com/TabooGT/notes.html>
 - Bumblebee build thread - <http://www.rcgroups.com/forums/showthread.php?t=634100&highlight=bumblebee>
 - SGII build thread - <http://www.rcgroups.com/forums/showthread.php?t=676909>
 - Apogee Sport build thread - <http://www.rcgroups.com/forums/showthread.php?t=595551>

Material List (All balsa used are contest grade except otherwise specified)

Wing

1. Wing rib 1/8" balsa. Harder balsa for tip panel ribs (rib #2 ~ #13).
2. Root rib 1/2" balsa or laminated 1/8 balsa (rib #1)
3. Tip block 3/8" balsa (or laminated 1/8 balsa) + 1.4 oz Kevlar + 0.75 oz FG enhancement (rib #14~#15) for shaping reference.
4. Top Spar 3/32" x 1/4" x 36" spruce
5. Vertical web 3/8" vertical grain balsa
6. Bottom Spar 1/16" x 3/16" x 36" spruce for top/bottom spars
7. Leading edge 1/8" hard wood dowel
8. Trailing edge 1/4" hard balsa
9. D-Box Sheeting 1/16" balsa (use wing framework to define D-box sheeting size)
10. Aileron 3/8" solid balsa aileron with lightening holes or 1/8" balsa build-up aileron

Tail Feather and Fuselage

1. Rudder 1/8" balsa
2. Elevator 1/8" balsa
3. Tail boom SGII compatible tail boom
4. Pod Taboo, Raptre or SGII compatible pods

Composite Materials

1. Wing joint 3oz FG + CF rod cross joint + 5oz CF for wing hold down hard point
2. Tip (launch peg) 1.4 oz Kevlar + 1.5 oz FG top and bottom
3. Aileron 0.75 oz FG perpendicular to balsa grain
4. Spar and ribs cap Not used in current version. Recommended if you're a power launcher.

Covering Material - Icarex, Nelson Lite or other light weight covering materials

Electronics

1. Receiver 4-6 ch light weight receiver

2. Servo 4x 5g (9g) servos
3. Battery 4-cell 250 mAh pack

Acknowledgement

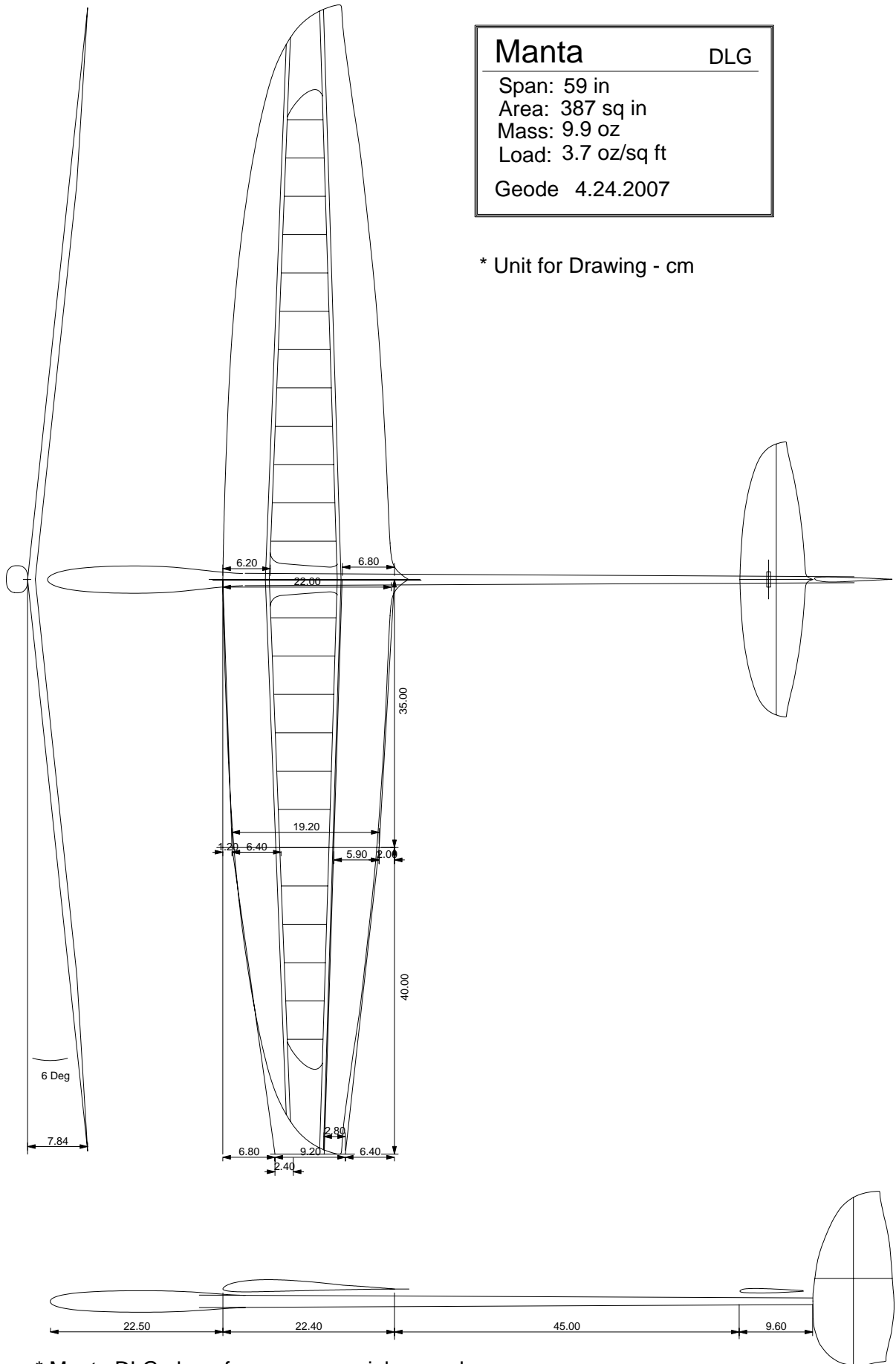
- Mark Drela - Super Gee and AG airfoils
- Oleg Golovidov - Taboo DLG and wing planform
- Jeb(Jose)/Jack – for detail balsa construction notes on Apogee sport
- Betamax/Bart – for Icarex covering on Drela-ized Bug DLG
- Cebola – for sharing his balsa creations on RCGroups
- Rendy – for working with me closely through out the whole development cycle
- RCGroups – a wonderful place to keep us informed
- Viewers like you – for your continuous support, encouragement and comments

Manta

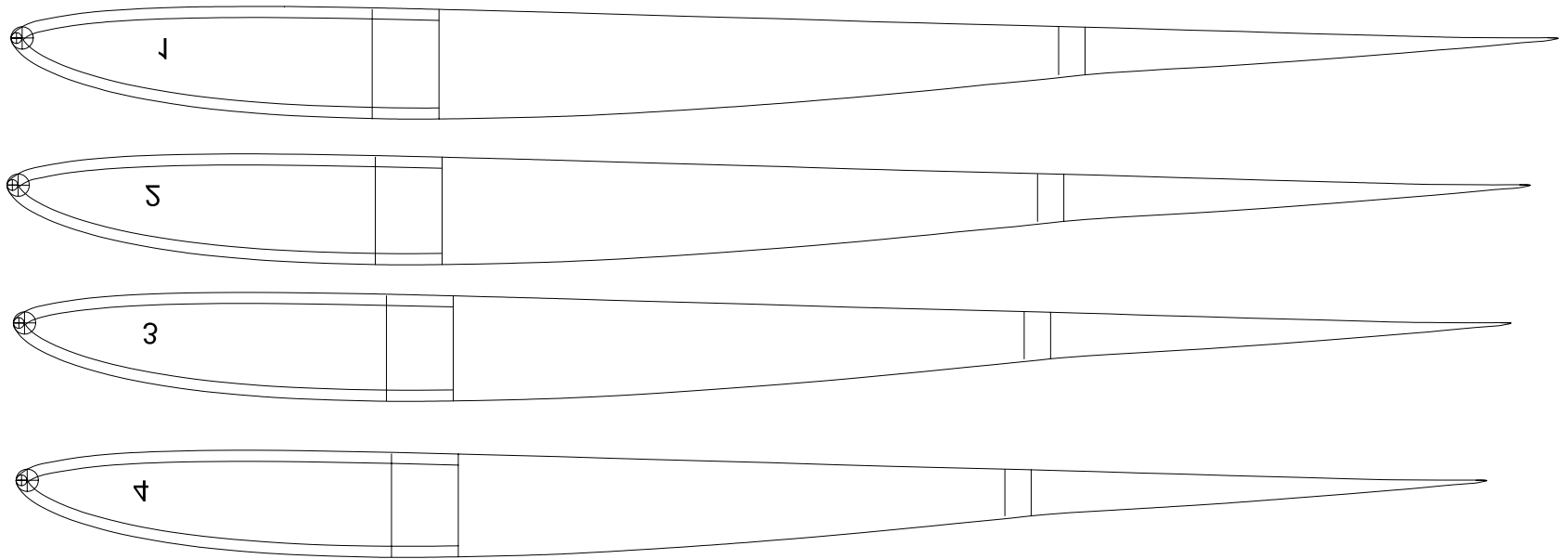
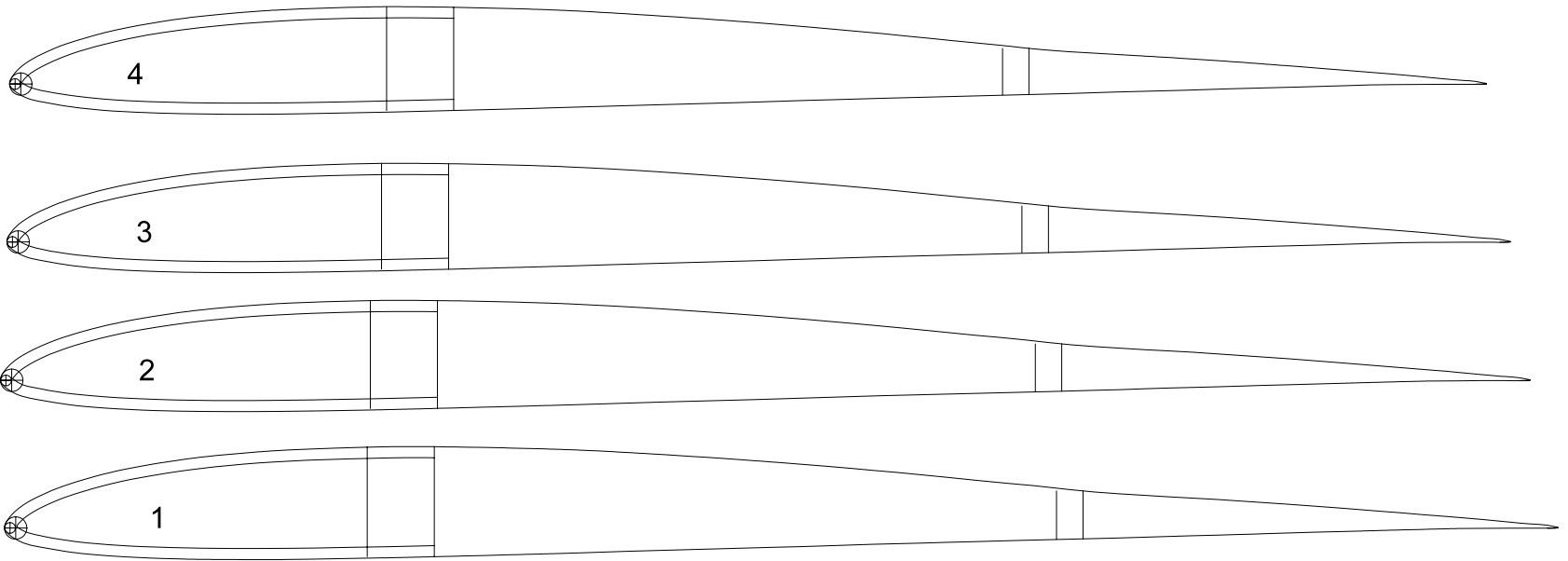
DLG

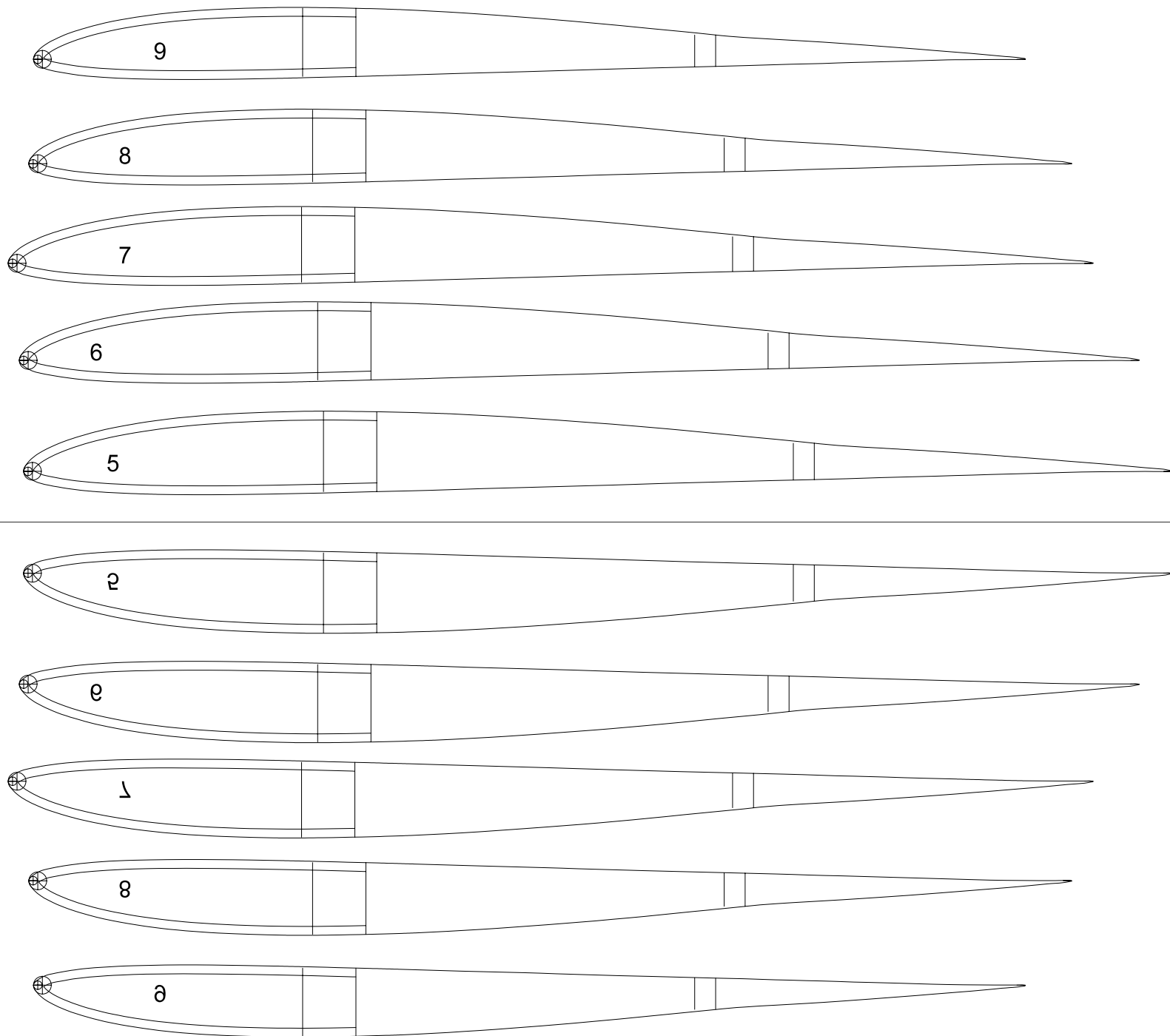
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Geode 4.24.2007

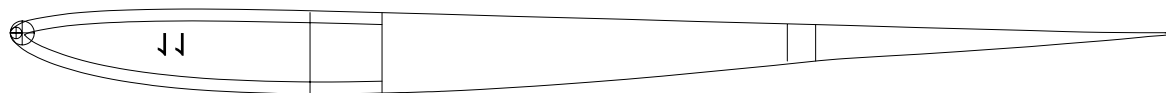
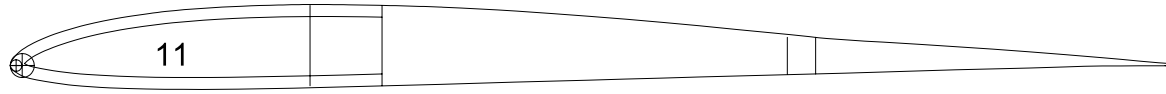
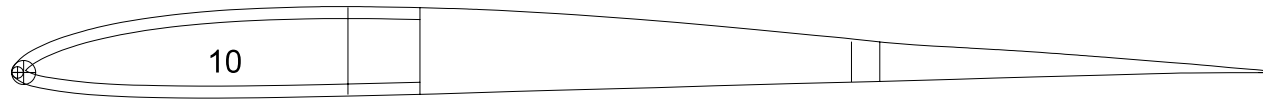
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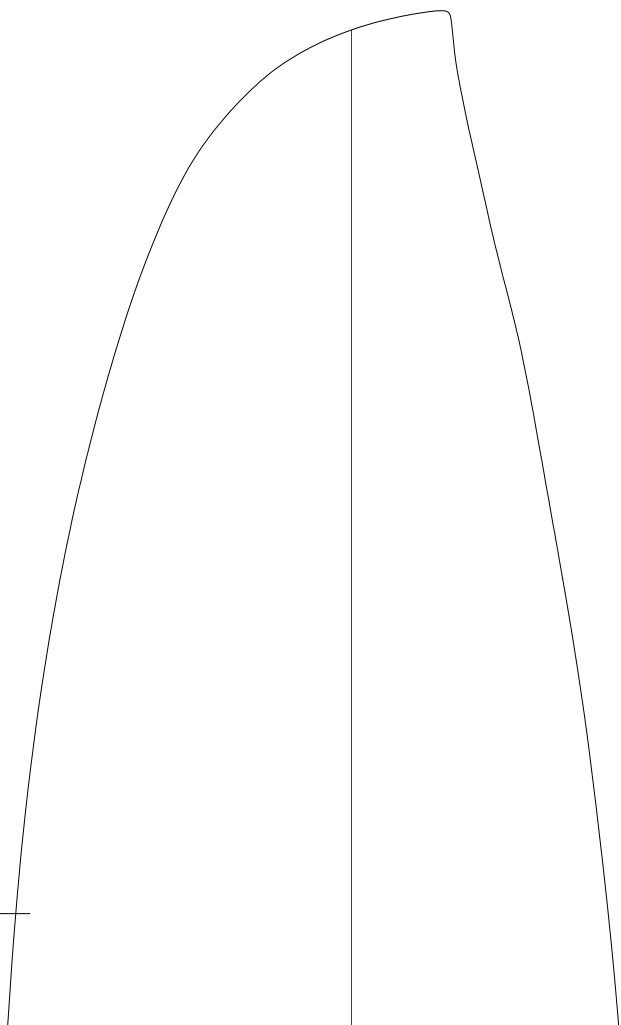
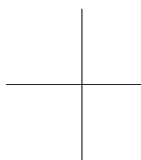
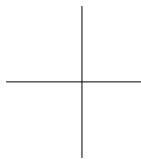


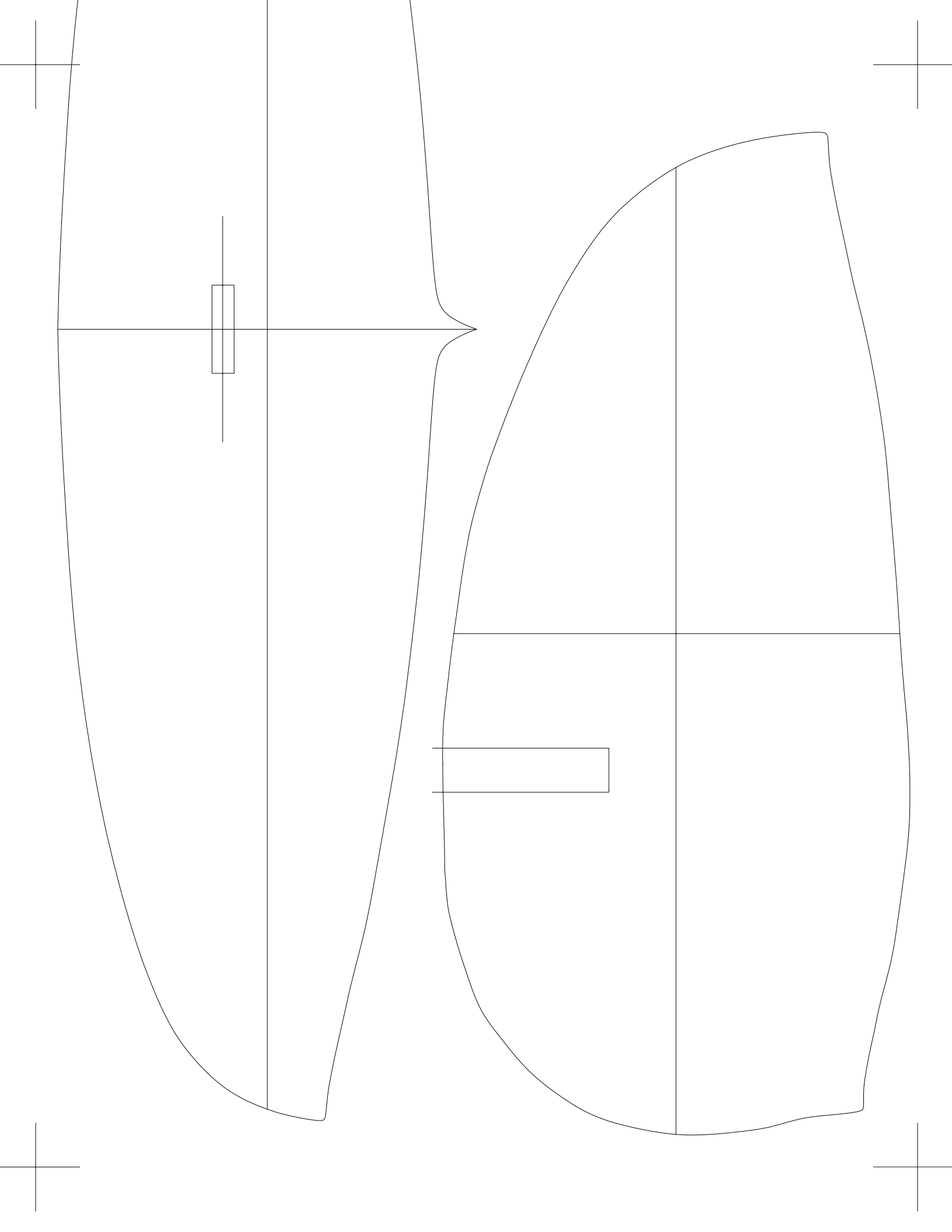
* Manta DLG plan - for non-commercial use only

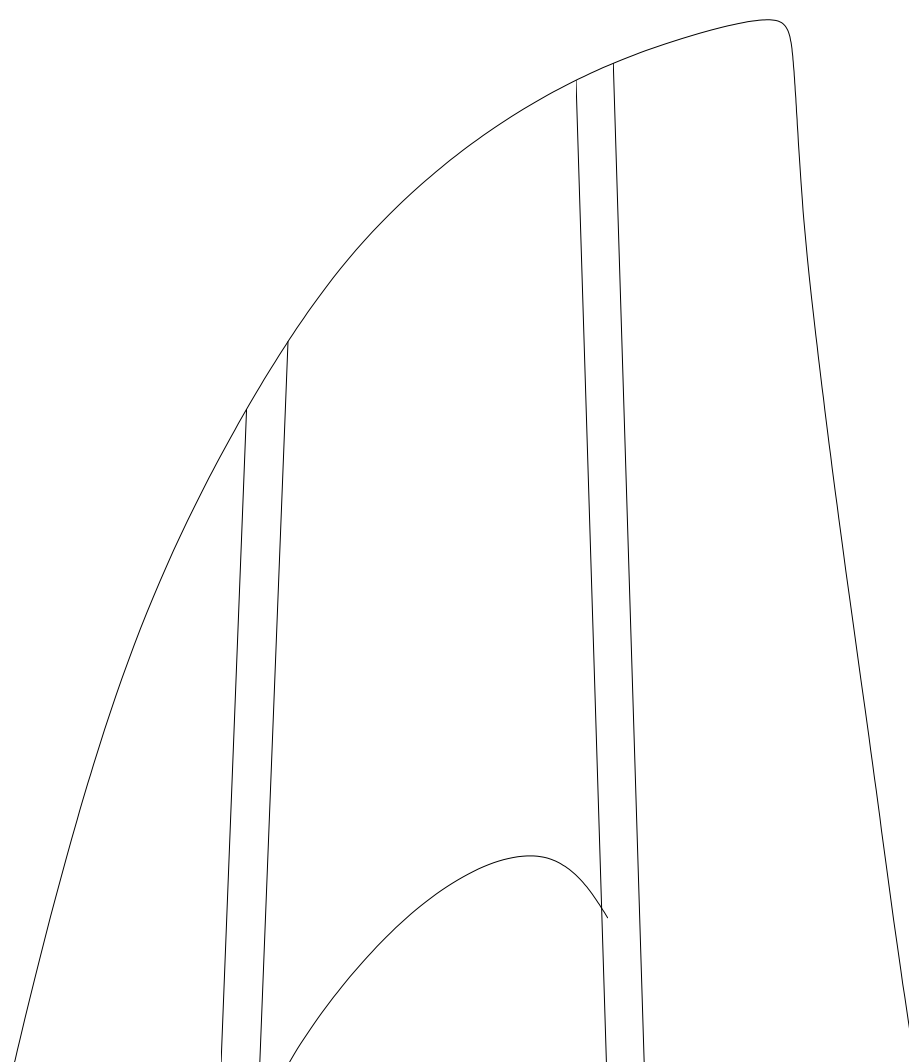
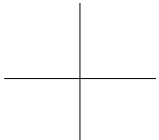
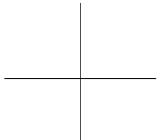
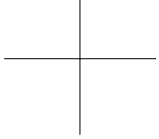
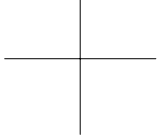


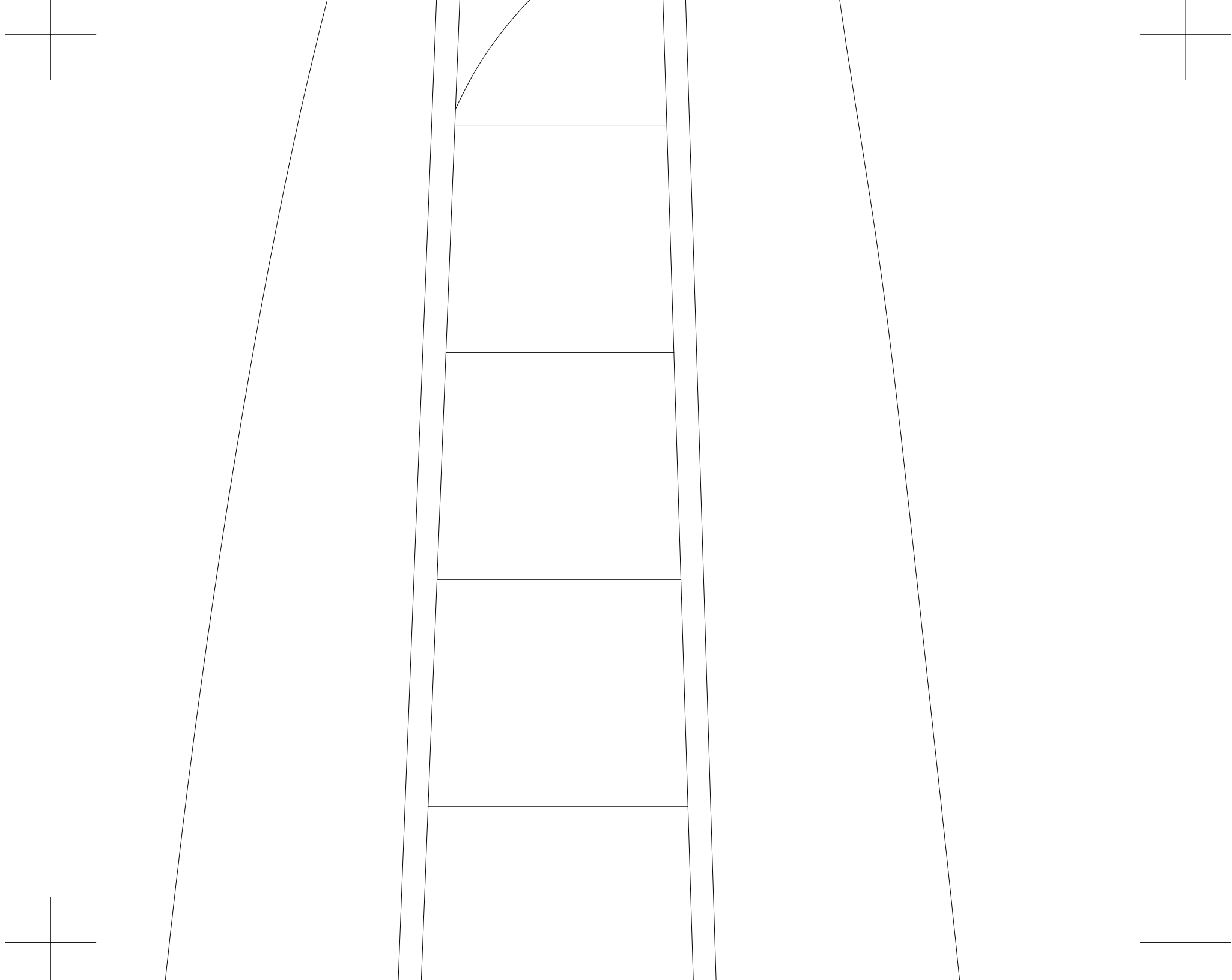


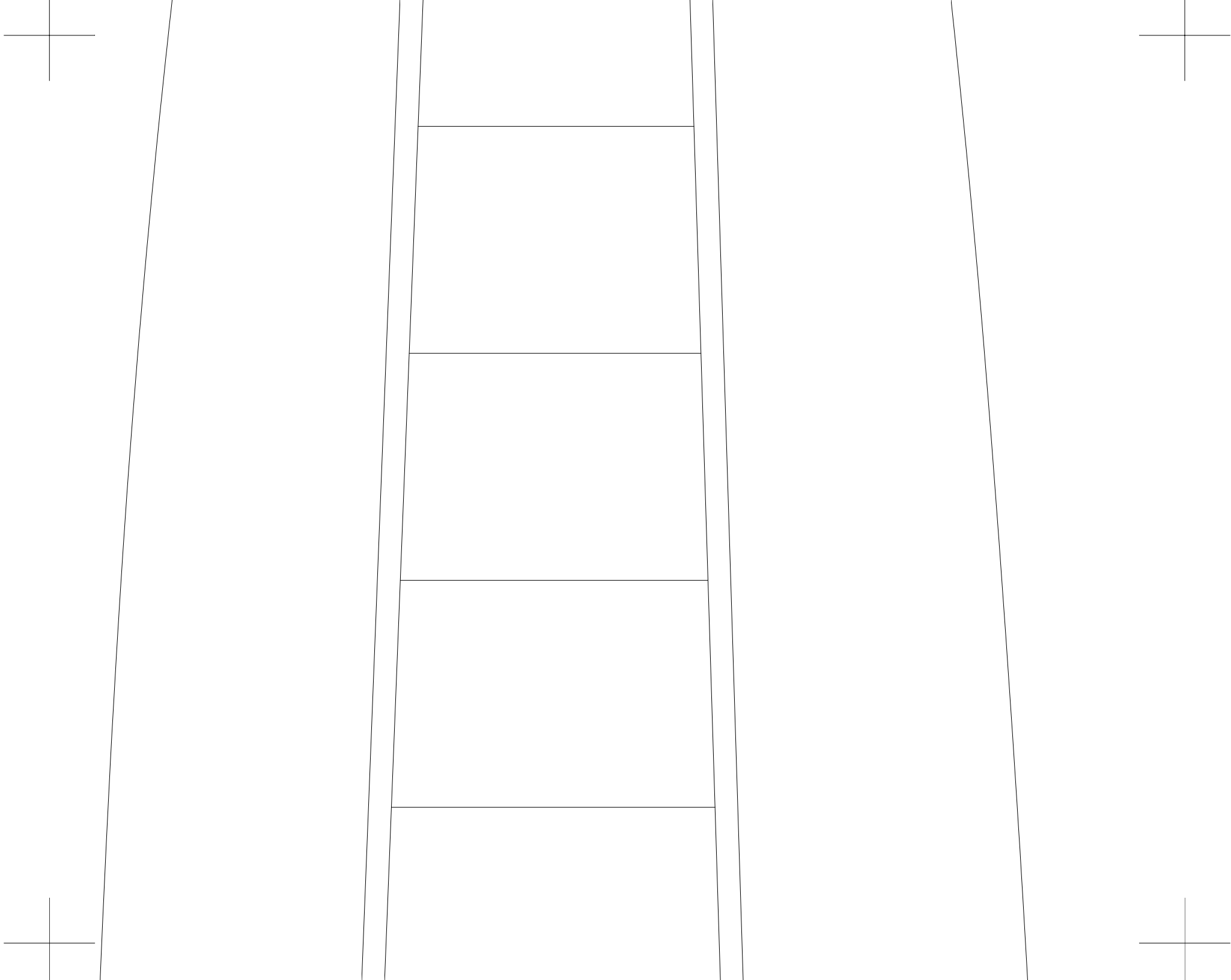


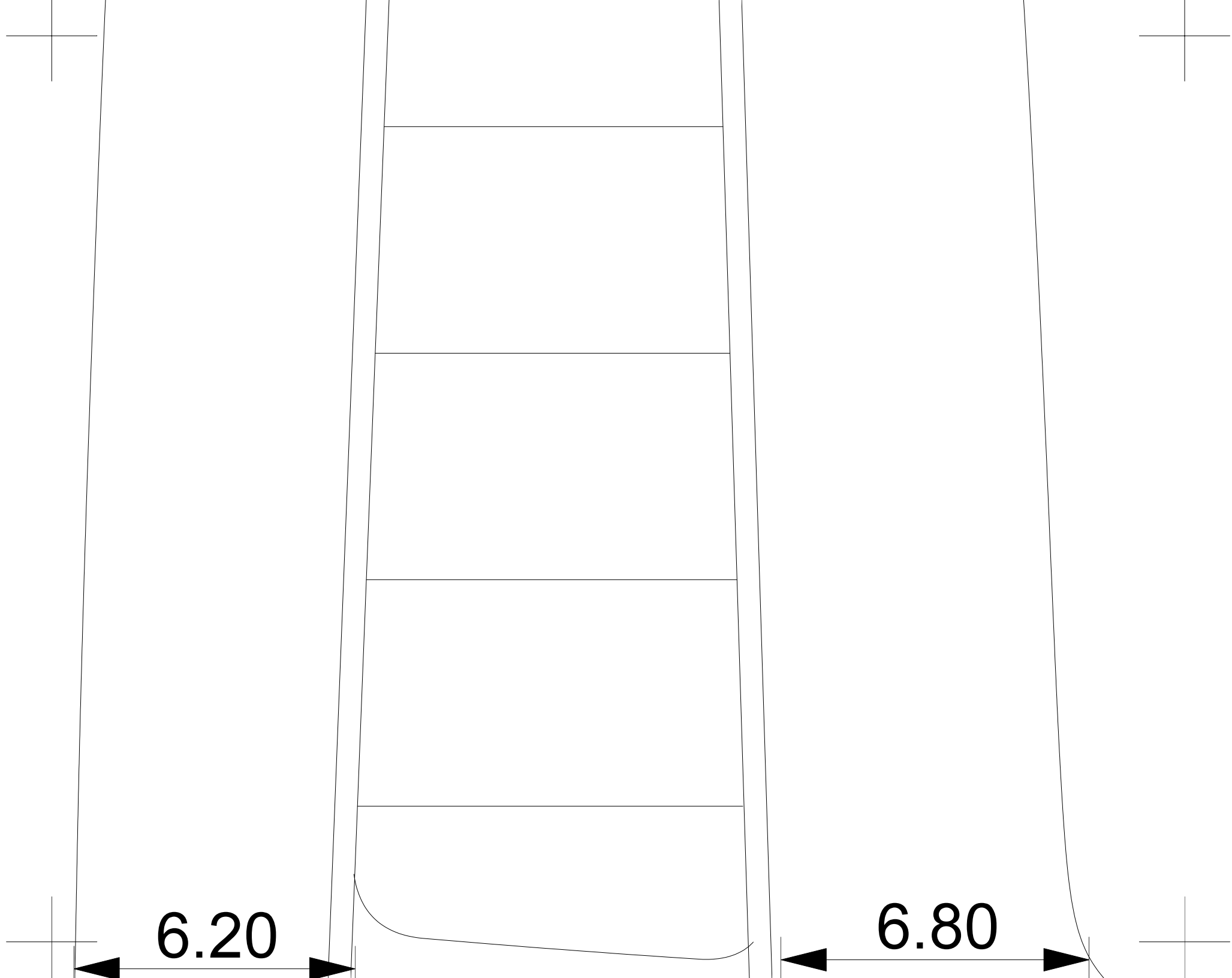












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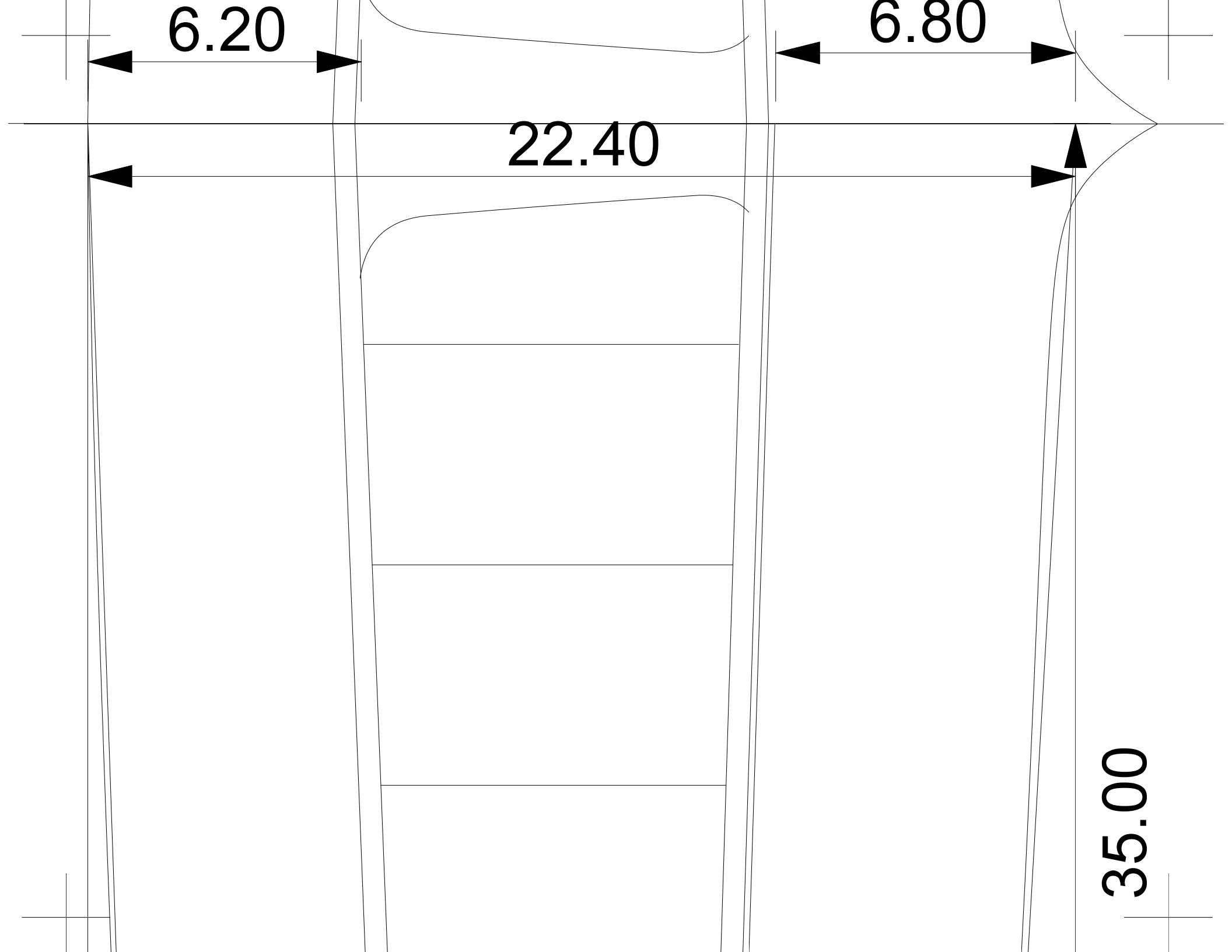
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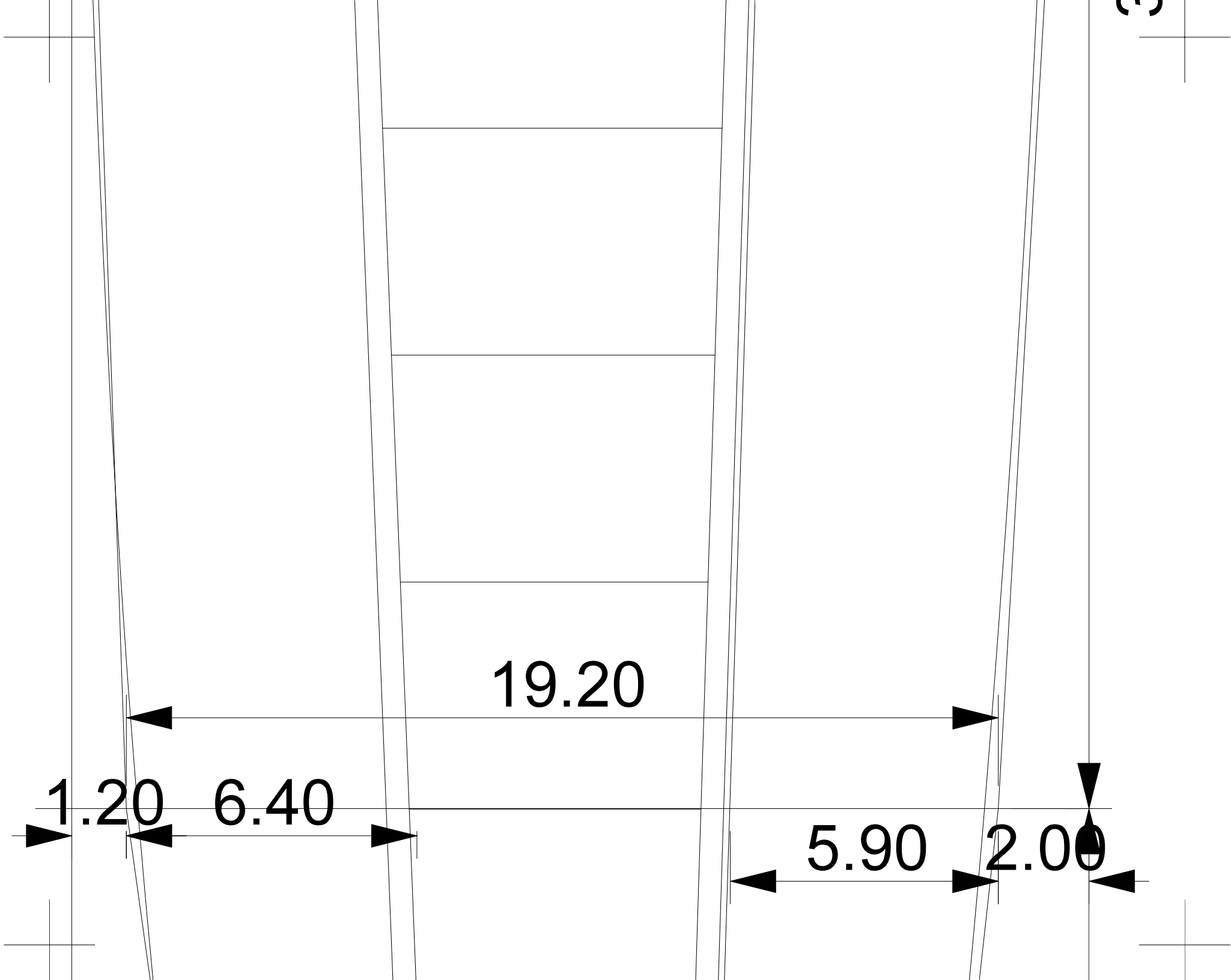
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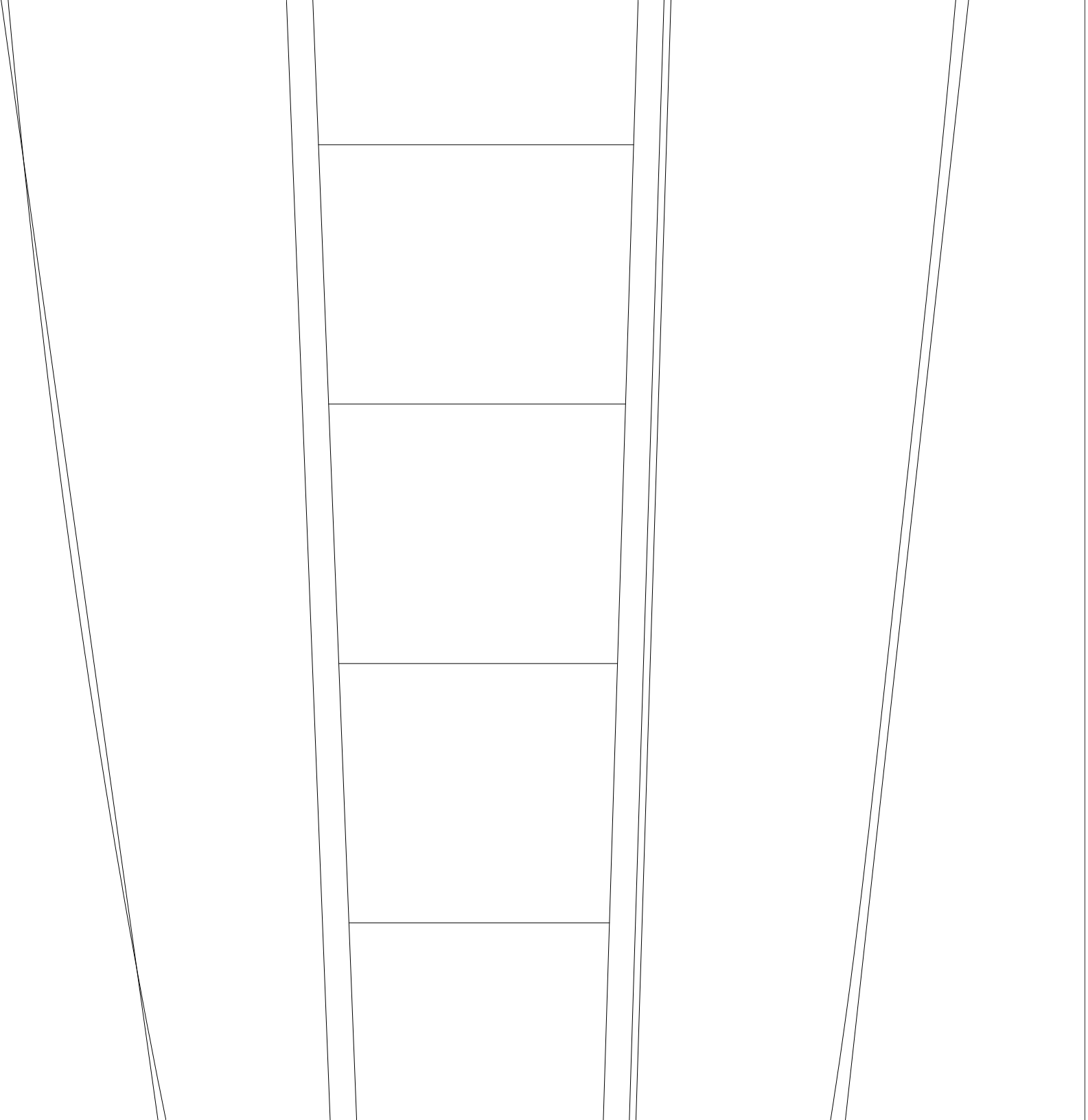
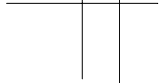
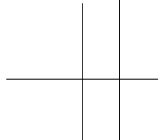
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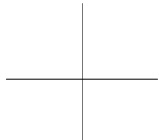
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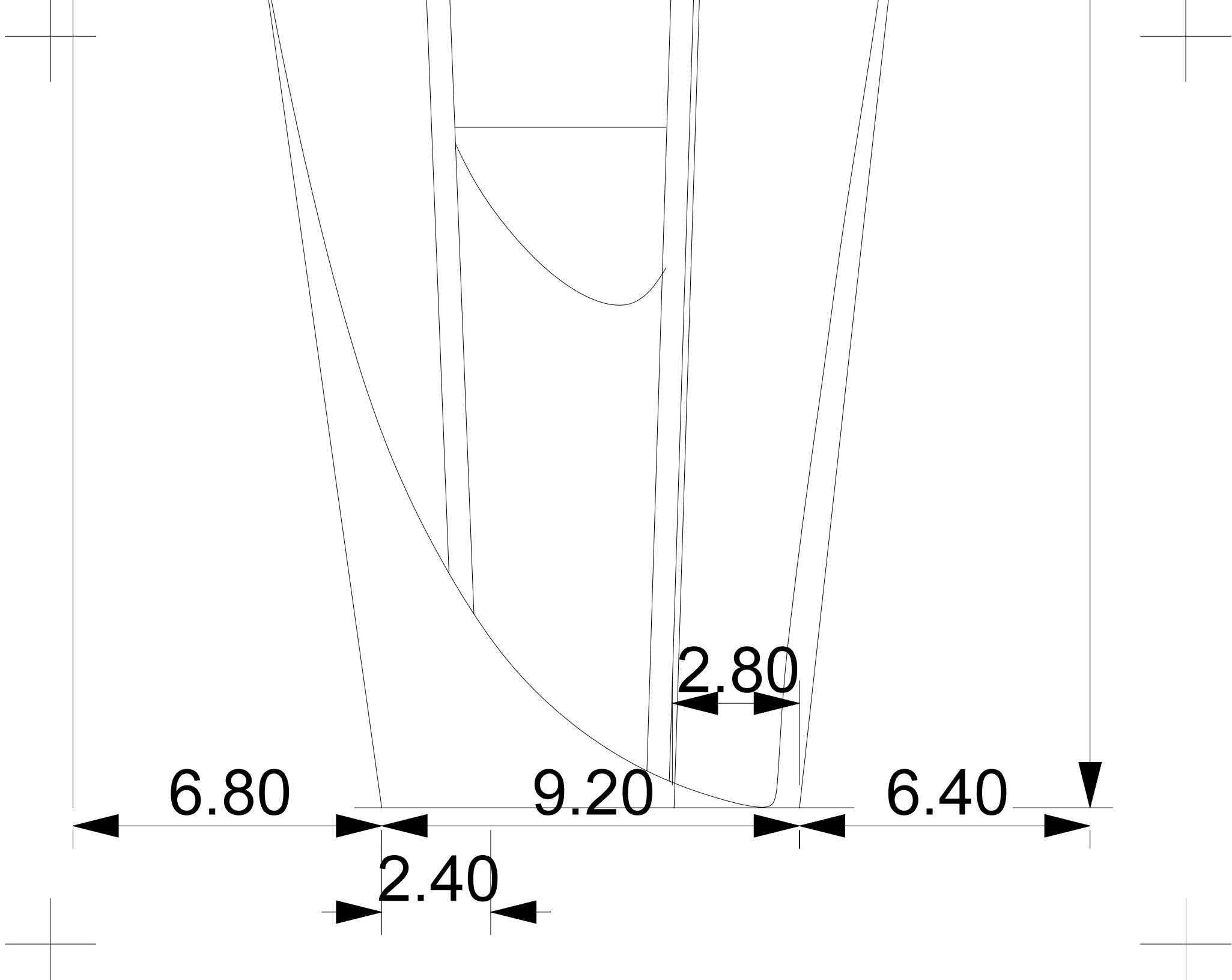


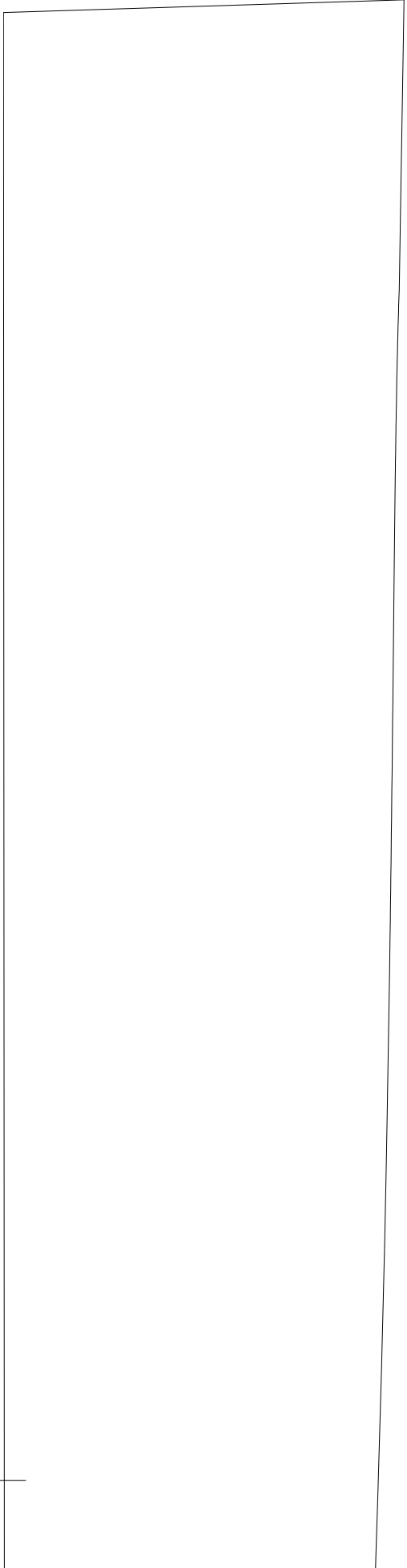




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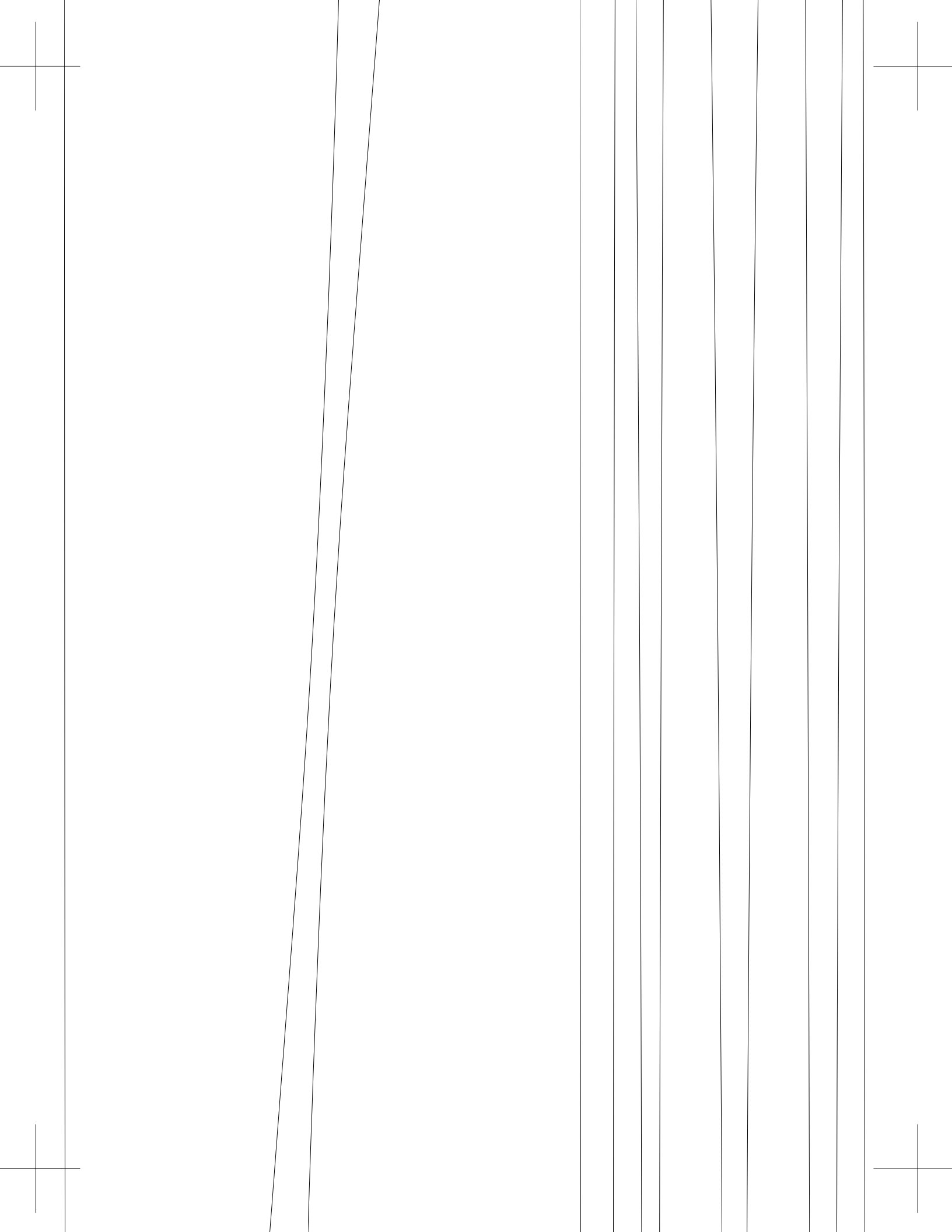


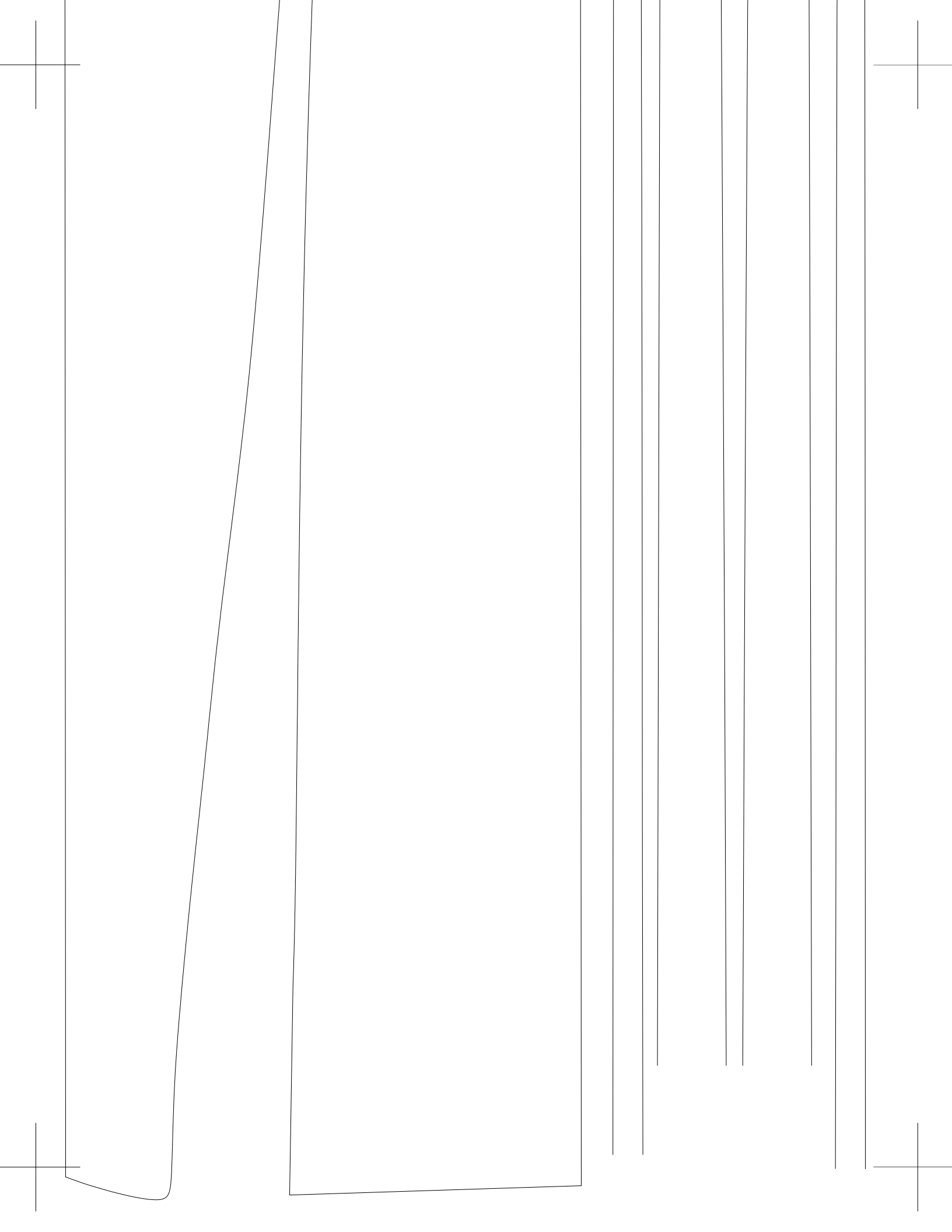


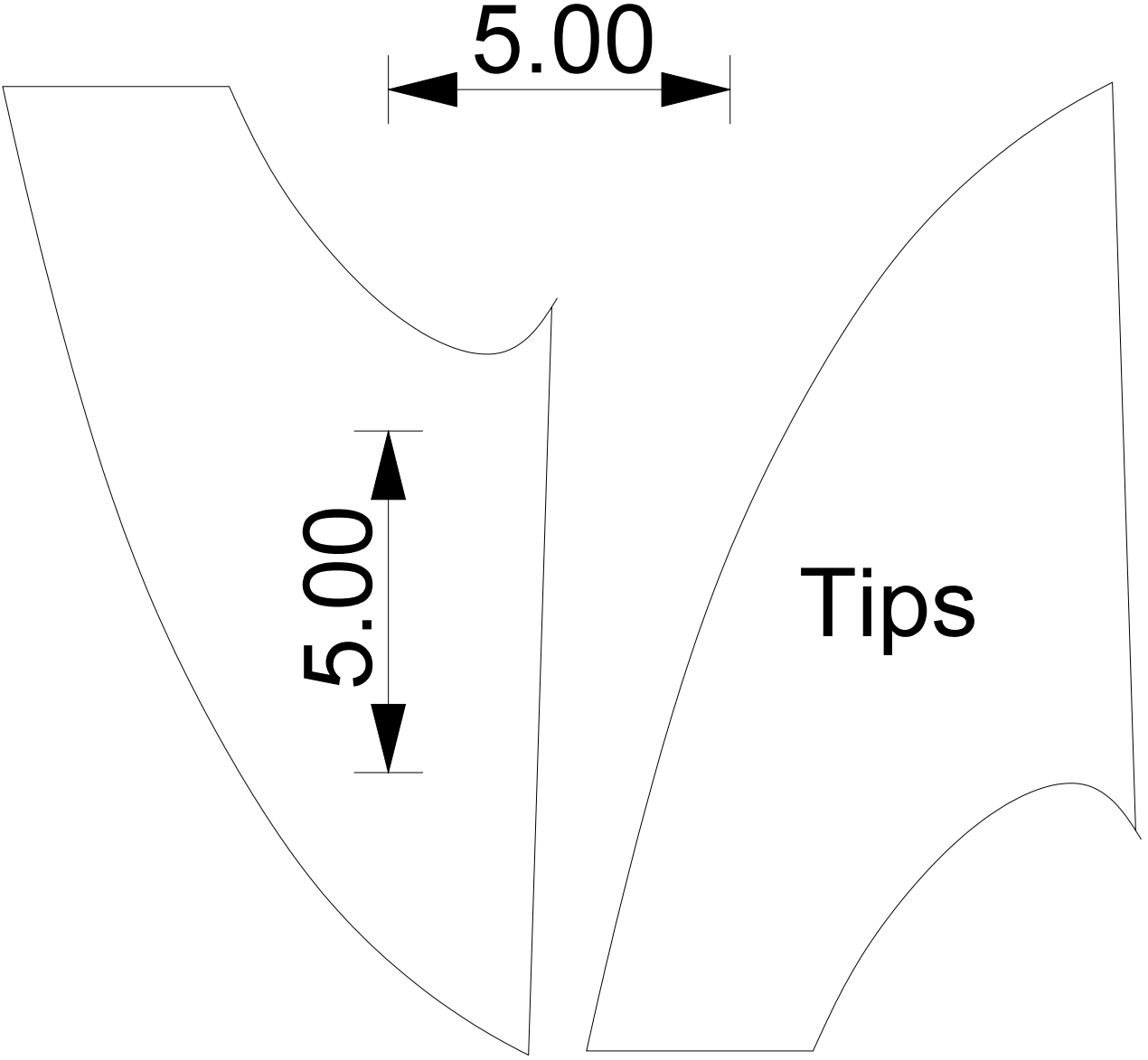
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Trailing Edge







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Tips