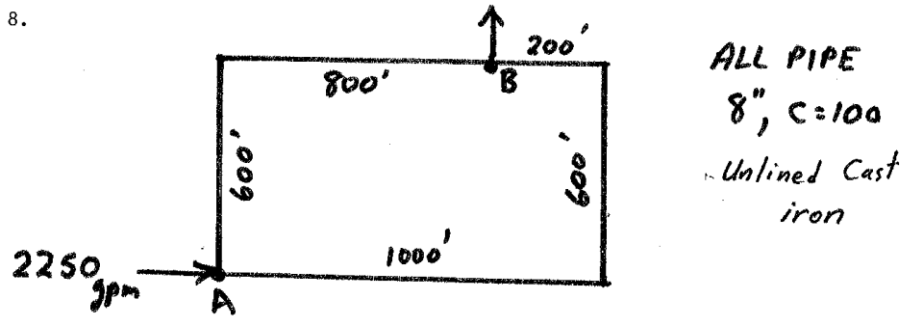


OBJECTIVES:

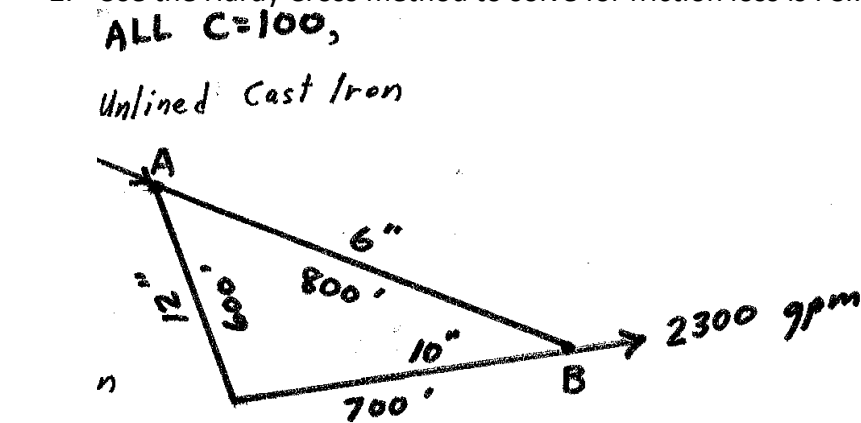
This laboratory unit is designed to practice Hardy-Cross method with problems of single and multiple loops. All problems are supposed to be solved with Hardy-Cross Method using attached spreadsheets. Determine the pressure lost in psi between Point A and Point B in the complex loop system shown below.

1. Use the Hardy Cross method to solve for friction loss is PSI.



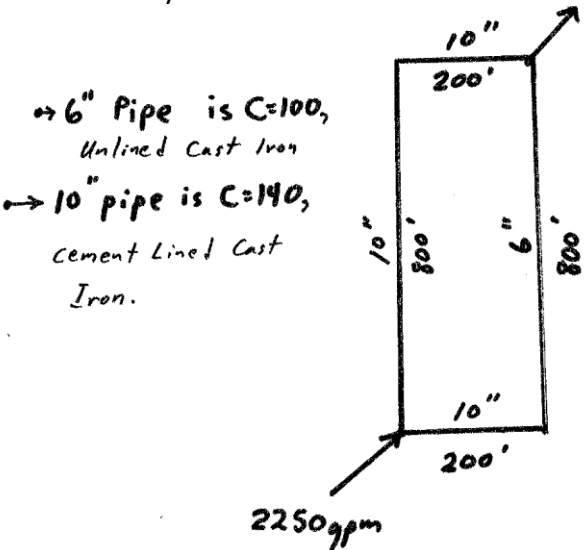
Loop No.	Line No.	Size	C-Factor	Length	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion

2. Use the Hardy Cross method to solve for friction loss is PSI.



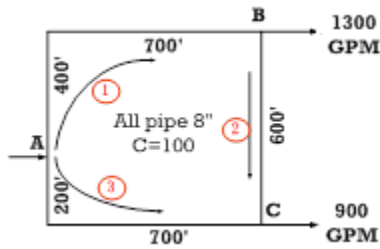
Loop No.	Line No.	Size	C-Factor	Length	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion

3. Use the Hardy Cross method to solve for friction loss is PSI.



Loop No.	Line No.	Size	C-Factor	Length	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc-tion

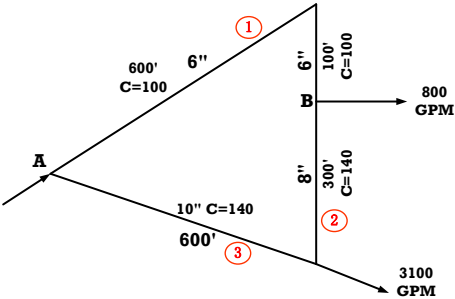
4. Find the pressure drop in PSI from A to B using Hardy-Cross method.



Initial guess: path 1= 1200gpm

Loop No.	Line No.	Size	C- Factor	Length	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion

5. Find the pressure drop in PSI from A to B using Hardy-Cross method.



Initial guess: path 1= 400gpm

Loop No.	Line No.	Size	C- Factor	Length	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion	Q (gpm)	P <sub>f</sub> (psi)	$\frac{1.85P_f}{Q}$	Correc- tion

Name: \_\_\_\_\_

Diagram of a pipe network with four segments labeled 1, 2, 3, and 4. Segment 1 is a horizontal pipe (8 inches diameter) 700 feet long. Segment 2 is a diagonal pipe (8 inches diameter) 200 feet long, discharging 600 gpm. Segment 3 is a diagonal pipe (4 inches diameter) 300 feet long, discharging 500 gpm. Segment 4 is a vertical pipe (8 inches diameter) 500 feet long, discharging 400 gpm. All pipes are unlined cast iron.

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Name: \_\_\_\_\_

Diagram illustrating a water distribution loop with four segments labeled 1, 2, 3, and 4.

- Segment 1:** 8" unlined cast iron ( $d=8.23$ ). Flow:  $-500 \text{ gpm}$ .
- Segment 2:** 6" enamel lined ductile iron ( $d=6.275$ ). Flow:  $300 \text{ gpm}$ .
- Segment 3:** 6" enamel lined ductile iron ( $d=6.275$ ). Flow:  $300 \text{ gpm}$ .
- Segment 4:** 8" pipe. Flow:  $300 \text{ gpm}$ .

The diagram shows a loop with a total length of 720' for the 8" section and 650' for the 6" section. The flow is indicated by arrows and gpm values.

[illegible]