Masons Capstone Web App

Final Design Documentation

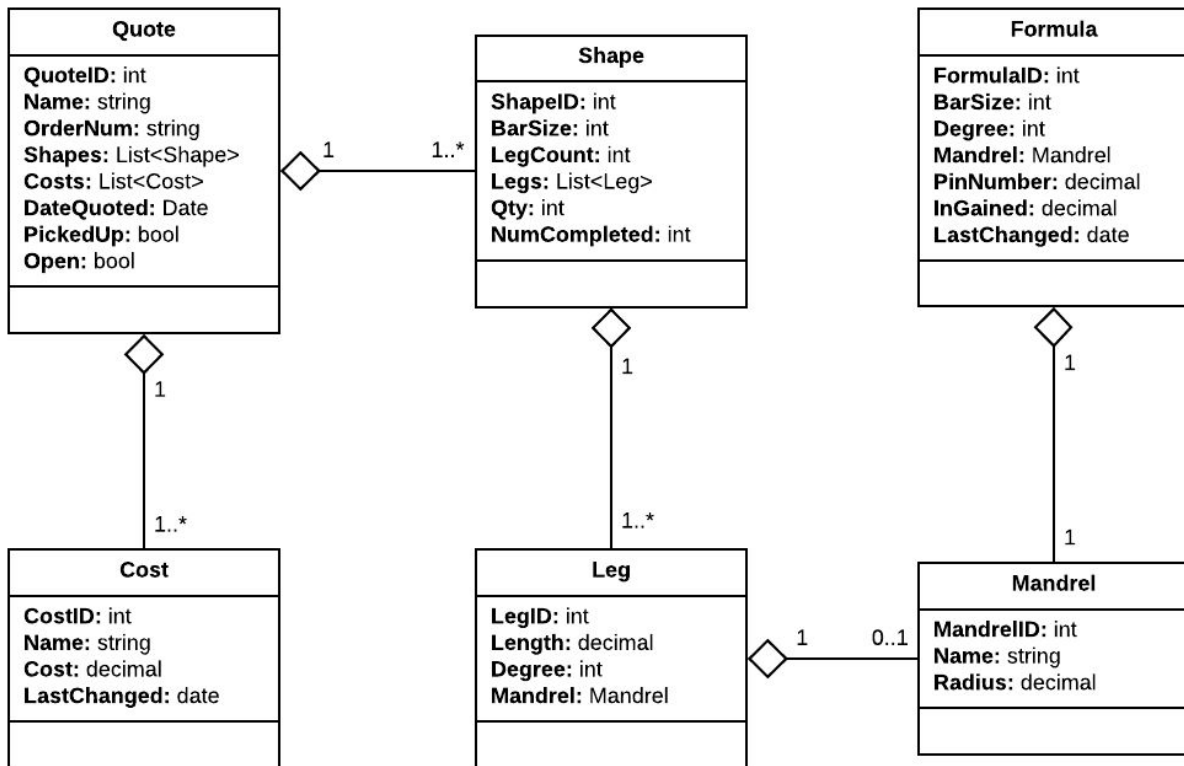Dane Woods

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Project Overview

The goal of this project is to develop a web app to be used by the Masons Supply Eugene branches, that will help in calculating the cost and amount of resources required to fulfill rebar orders. Also, it will be able to retrieve previously input information such as formulas for certain bends and procedures that will facilitate their workflow. Features will include:

A. Order cost calculator
   i. Number of 20 ft. bars required
   ii. Number of bends required
   iii. Number of cuts required
   iv. A report on how to use rebar remnants efficiently
   v. Dynamic calculation for formulas the user hasn't manually entered
B. Formula Management
   i. Form to enter length gained in a bend
   ii. Searchable formulas based on bar thickness, mandrel size, and degree of bend
C. Cost Management
   i. Form to enter the cost or rebar, bends, and cuts for each size of rebar
   ii. Form to enter the cost of a setup charge and the total cost that will trigger a setup charge
D. Reviewing Quotes
   i. A list of open quotes that will display whether or not the order has been picked up and the completion progress of each shape
   ii. A button for each quote to recalculate the total cost based on cost changes
   iii. A list of closed quotes that can be reopened if needed
E. Admin Login
   i. A forgot password button to allow logging in through the admin's email
   ii. Site pages that can only be accessed by the admin

Domain Model

Quote

QuoteID: int
Name: string
OrderNum: string
Shapes: List<Shape>
Costs: List<Cost>
DateQuoted: Date
PickedUp: bool
Open: bool

Shape

ShapeID: int
BarSize: int
LegCount: int
Legs: List<Leg>
Qty: int
NumCompleted: int

Formula

FormulaID: int
BarSize: int
Degree: int
Mandrel: Mandrel
PinNumber: decimal
InGained: decimal
LastChanged: date

1   1..*

1

1

Cost

CostID: int
Name: string
Cost: decimal
LastChanged: date

1..*

Leg

LegID: int
Length: decimal
Degree: int
Mandrel: Mandrel

1..*

1   0..1

Mandrel

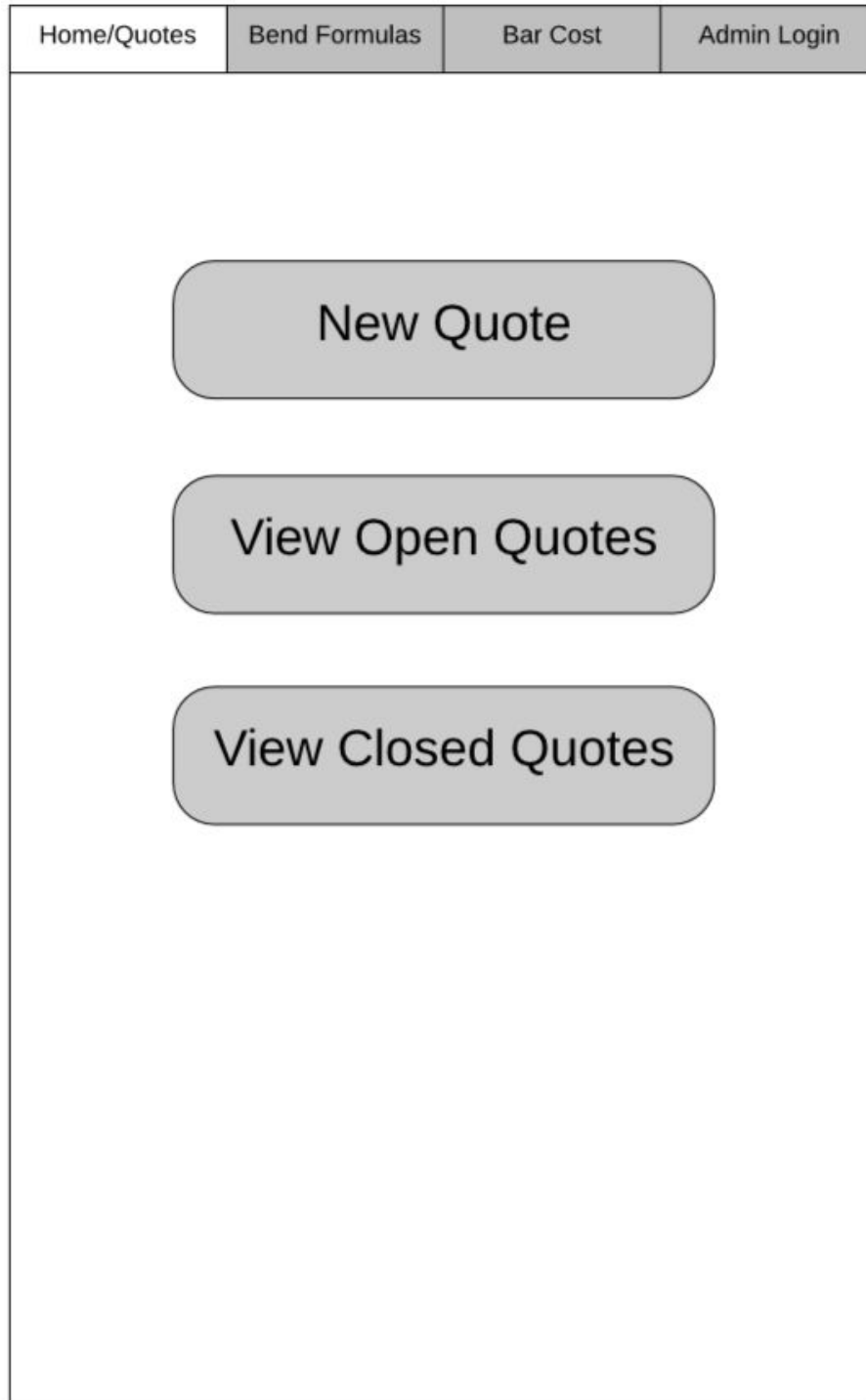MandrelID: int
Name: string
Radius: decimal

1

1

The user enters formulas that will be used to calculate quotes. A formula defines how much shorter a shape will need to be cut based on the angle of its bends. Part of a bend is defined by a mandrel. A quote will have custom shapes. Every shape will have legs that make up the shape. A leg will have a length and a bend which is partially defined by a mandrel. The user will enter prices for the different sizes of rebar and the prices of cuts and bends. These prices will be the costs in the database. When a quote is made, copies of needed costs are added to the quote. That way if the user changes the costs in the database, the quote that was promised to a customer won't change price because it's reading from its own list of costs.

UI Diagrams

UI #1: Home Page

Models used: None

Sub-section: Order Cost Calculator

Users will start by entering the rebar size and number of legs the first shape in the quote will have. When the user clicks "Enter", the form populates with textboxes and dropdowns to allow the user to ether the data for each leg in the shape. The user can restart the process by clicking "Next Shape" until all the shapes of the quote have been entered. The user can then click "Finish Quote" to see the review of the total cost and the number of bars, cuts, and bends required to fabricate the order. The review will also give instructions on the order to fabricate the shapes in, in order to most efficiently use remnants of shapes. The quote review page is also where the user can enter the quote name, and assign an order number to the quote.

UI #2: Shape Entry

Models used: Quote, Shape, Leg, Mandrel, Formula

UI #3: Finished Quote Review
Models used: Quote, Shape, Leg, Mandrel, Cost, Formula

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Quote Name: Bob's Concrete W 11th Project

Order Number: 5623148

Total Cost: $454.40

#4 Bars Used: 14 ($10 ea.) + 40 Cuts ($0.25 ea.) + 80 Bends ($0.25 ea.)

#5 Bars Used: 15 ($15 ea.) + 90 Cuts ($0.33 ea.) + 90 Bends ($0.33 ea.)

Setup Charge: $0.00

#4 Remnants: (15" x 13), (165" x 1)

#5 Remnants: (20" x 5)

Instructions
Perform cuts in the following order.

1st Shape(x30): 10 bars of #5 needed   Edit 🗑

Cut each piece at: 70"
Cut (3) per (20' bar) for (10 bars)

Leg 1: 36"
Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Remnants: (30" x 10) Will Be Used Again

2nd Shape(x60): 5 bars of #5 needed   Edit 🗑

Cut each piece at: 22"
Cut (1) per (30" remnant) for (10 remnants)
Cut (10) per (20' bar) for (5 bars)

Leg 1: 36"
Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Remnants: (20" x 5) Not Used Again

3rd Shape(x40): 14 bars of #4 needed   Edit 🗑

Cut each piece at: 75"
Cut (3) per (20' bar) for (13 bars)
Cut (1) per (20' bar) for (1 bars)

Leg 1: 30"
Bend 1: 90°, Small Mandrel
Leg 2: 18"
Bend 2: 90°, Small Mandrel
Leg 3: 30"

Remnants: (15" x 13) Not Used Again, (165" x 1) Not Used Again

[Add Shape]   [Save Quote]

Sub-section: Formula Management

Users can view all formulas that are in the database. They can search for specific formulas based on bar size, degrees, and/or the mandrel. Users can edit existing formulas or add a new one. Formulas are composed of a bar size, degree, mandrel, pin number, and inches gained from the bend.

UI #4: Formula Searching

Models used: Formula, Mandrel

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Bar Size: Bend Degrees: Mandrel Size:

#4 ▼	90 ▼	Small ▼
#3	45	Medium
#5	135	Large
#6	180	

Search

Bar	Degree	Mandrel	Pin	In. Gained	
#4	90	Small	16.5	1.5	Edit
#4	45	Small	9	0.5	Edit
#3	90	None	17	1	Edit
#5	90	Medium	15	2	Edit
#5	90	Large	12.5	2.5	Edit

New Formula

UI #5: Formula Entry

Models used: Formula, Mandrel

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Bar Size:

#5 ▼
#3
#4
#6

Degree:

135

Mandrel Size:

Medium ▼
Large

Results In

↓

Pin At:

6

Inches Gained:

0.5

Save Formula

Sub-section: Cost Management

Users can enter costs that will be used in the calculation of the total cost of quotes. Every cost records the date of the last time it was changed so the user can gauge if they need to check whether steel prices have changed in that time.

UI #6: Cost Entry

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

#3

Bar Cost:
$5.00
(1/1/2020)

Bend Cost:
$0.25
(1/1/2020)

Cut Cost:
$0.25
(1/1/2020)

#4

Bar Cost:
$10.00
(1/1/2020)

Bend Cost:
$0.25
(1/1/2020)

Cut Cost:
$0.25
(1/1/2020)

#5

Bar Cost:
$15.00
(1/1/2020)

Bend Cost:
$0.33
(1/1/2020)

Cut Cost:
$0.33
(1/1/2020)

#6

Bar Cost:
$20.00
(1/1/2020)

Bend Cost:
$0.40
(1/1/2020)

Cut Cost:
$0.40
(1/1/2020)

Setup Fee

Cost:
$15.00
(1/1/2020)

Price Where Steup Charge Is No Longer Applied:
$150.00
(1/1/2020)

Save Changes

Dates are since last change.

Sub-section: Reviewing Quotes

From the home page, users can view lists of either open or closed quotes. Open quotes will display the completion progress of each shape as well as whether or not the customer has picked up the quote's order. When reviewing the details of an individual quote, users can update the completion progress of a shape, mark the quote as picked up, mark the quote as closed, edit the contents of any shape, or have the quote recalculate its total cost based on possibly altered prices from the cost management page. Users can view a list of closed quotes and review their details, but nothing in the quote can be edited while it's closed. A user can reopen a closed quote while reviewing it. Users can delete an open or closed quote while reviewing it, but are taken to a warning page in case the button was clicked accidentally.

UI #7: Open Quotes
Models used: Quote, Shape

UI #8: Open Quote Review
Models used: Quote, Shape, Leg, Mandrel, Cost, Formula

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Quote Name: | Bob's Concrete W 11th Project

Order Number: | 5623148

Total Cost: $454.40 [Update Cost]

#4 Bars Used: 14 ($10 ea.) + 40 Cuts ($0.25 ea.) + 80 Bends ($0.25 ea.)

#5 Bars Used: 15 ($15 ea.) + 90 Cuts ($0.33 ea.) + 90 Bends ($0.33 ea.)

Setup Charge: $0.00

#4 Remnants: (15" x 13), (165" x 1)

#5 Remnants: (20" x 5)

Customer has picked up? ☐

Instructions

Perform cuts in the following order.

1st Shape(x30): 10 bars of #5 needed   Edit 🗑

Cut each piece at: 70"
Cut (3) **per** (20' bar) **for** (10 bars)

Leg 1: 36"
  Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Completed:
30

Remnants: (30" x 10) Will Be Used Again

2nd Shape(x60): 5 bars of #5 needed   Edit 🗑

Cut each piece at: 22"
Cut (1) **per** (30" remnant) **for** (10 remnants)
Cut (10) **per** (20' bar) **for** (5 bars)

Leg 1: 36"
  Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Completed:
45

Remnants: (20" x 5) Not Used Again

3rd Shape(x40): 14 bars of #4 needed   Edit 🗑

Cut each piece at: 75"
Cut (3) **per** (20' bar) **for** (13 bars)
Cut (1) **per** (20' bar) **for** (1 bars)

Leg 1: 30"
  Bend 1: 90°, Small Mandrel
Leg 2: 18"
  Bend 2: 90°, Small Mandrel
Leg 3: 30"

Completed:
0

Remnants: (15" x 13) Not Used Again, (165" x 1) Not Used Again

[Add Shape]   [Save Quote]

[Close Quote]   [Delete Quote]

UI #9: Closed Quotes
Models used: Quote, Shape

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Closed Quotes

Sort by: | Date ▼ |
| Alphabetical |

Bob's Concrete W 11th Project
$454.40

1st Shape: #5 Bar, 2 Legs (x30)

2nd Shape: #5 Bar, 2 Legs (x60)   Details

3rd Shape: #4 Bar, 3 Legs (x40)

Cement Solutions
$256.00

1st Shape: #3 Bar, 1 Legs (x230)   Details

UI #10: Closed Quote Review
Models used: Quote, Shape, Leg, Mandrel, Cost, Formula

Bob's Concrete W 11th Project
Order Number: 5623148

Total Cost: $454.40

#4 Bars Used: 14 ($10 ea.) + 40 Cuts ($0.25 ea.) + 80 Bends ($0.25 ea.)

#5 Bars Used: 15 ($15 ea.) + 90 Cuts ($0.33 ea.) + 90 Bends ($0.33 ea.)

Setup Charge: $0.00

#4 Remnants: (15" x 13), (165" x 1)

#5 Remnants: (20" x 5)

Instructions
Perform cuts in the following order.

1st Shape(x30): 10 bars of #5 needed

Cut each piece at: 70"
Cut (3) **per** (20' bar) **for** (10 bars)

Leg 1: 36"
  Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Remnants: (30" x 10) Will Be Used Again

2nd Shape(x60): 5 bars of #5 needed

Cut each piece at: 22"
Cut (1) **per** (30" remnant) **for** (10 remnants)
Cut (10) **per** (20' bar) **for** (5 bars)

Leg 1: 36"
  Bend 1: 90°, Medium Mandrel
Leg 2: 36"

Remnants: (20" x 5) Not Used Again

3rd Shape(x40): 14 bars of #4 needed

Cut each piece at: 75"
Cut (3) **per** (20' bar) **for** (13 bars)
Cut (1) **per** (20' bar) **for** (1 bars)

Leg 1: 30"
  Bend 1: 90°, Small Mandrel
Leg 2: 18"
  Bend 2: 90°, Small Mandrel
Leg 3: 30"

Remnants: (15" x 13) Not Used Again, (165" x 1) Not Used Again

[Reopen Quote]   [Back to List]

[Delete Quote]

UI #11: Delete Quote
Models used: Quote

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Are you sure you want to permanently delete the quote "Bob's Concrete W 11th Project"?

Yes, Delete   No

Sub-section: Admin Login

The site will have one IdentityUser account with the role of admin. The admin can login from any page in the site. The admin must enter a password to login. An admin account has an email address associated with it that is used to help with logging in when the admin has forgotten their password. If the admin is logged in, the login tab in the navigation bar of every page will take them to the admin settings page where they can logout, or change their email and password.

UI #12: Login Page
Models used: IdentityUser

UI #13: Admin Settings/Logout
Models used: IdentityUser

Home/Quotes	Bend Formulas	Bar Cost	Admin Login

Admin Management

Logout

Edit Admin

Email: Admin@gmail.com

Password: Password

Save Changes

Schedule

First Sprint: April 7th - April 13th
Features to implement:
Cost Management,
Formula Management

Second Sprint: April 14th - April 27th
Features to implement:
Order Cost Calculator

Third Sprint: April 28th - May 11th
Features to implement:
Order Cost Calculator (Dynamic Calculation),
Review Quotes (Open Quotes)

Forth Sprint: May 12th - May 25th
Features to implement:
Review Quotes (Closed Quotes),
Admin Login

Fifth Sprint: May 26th - June 5th
Bug Fixing and Testing