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9/10/10

To Whom It May Concern,

Subject:

I have reviewed the structural concerns of the building in relation to gravity & wind engineering and I have determined the following conclusion:

Code Requirement.....2003 IRC

## Site information

Building location.....O'fallon, MO
Building importance factor.....2
Wind exposure category.....B
Basic wind speed.....90MPH
Wind load importance factor.....1
Seismic category.....C
Seismic importance factor.....1

## Construction material data

Concrete min compressive strength.....3000 psi
Min rebar grade.....grade 60

## Lintel design

**Supporting only roof load**

Maximum opening.....10'-0"
Live load applied.....300 plf
Dead load applied.....300 plf
Stirrup size.....#3 bars

Conclusion: see exhibit 1 for calculations
Lintels shall be constructed per exhibits 2 and 3.

**Supporting roof and light frame story above**

Maximum opening.....10'-0"
Live load applied.....600 plf
Dead load applied.....860 plf
Stirrup size.....#3 bars

Conclusion: see exhibit 4 for calculations
Lintels shall be constructed per exhibits 2 and 3.

**Supporting roof and (1) ICF story above**

Maximum opening.....10'-0"
Live load applied.....1130 plf
Dead load applied.....860 plf
Stirrup size.....#3 bars

Conclusion: see exhibit 5 for calculations
Lintels shall be constructed per exhibits 2 and 3.

If you have any questions related to this report please contact me.



Thomas J. Huneke, P.E. 19552
Prepared by Ryan K. Holdener

EXHIBIT 1

Title :
Dsgnr:
Description :

Scope :

Job #
Date: 2:24PM, 10 SEP 10



# Multi-Span Concrete Beam



**Description** roof only

## General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

| | | | | | |
|---|---|---|---|---|---|
| Fy | 60,000.0 psi | All Spans Considered as Individual Beams | | ACI Dead Load Factor | 1.40 |
| f'c | 3,000.0 psi | Stirrup Fy | 40,000.0 psi | ACI Live Load Factor | 1.70 |

## Concrete Member Information

| Description | | | |
|---|---|---|---|
| Span | | ft | 10.00 |
| Beam Width | | in | 5.50 |
| Beam Depth | | in | 12.00 |
| End Fixity | | | Fix-Fix |
| Reinforcing | Center | Area | 0.31in2 |
| | | Bar Depth | 10.00in |
| | Left | Area | 0.31in2 |
| | | Bar Depth | 2.00in |
| | Right | Area | 0.31in2 |
| | | Bar Depth | 2.00in |

## Loads

| | | |
|---|---|---|
| Using Live Load This Span ?? | | Yes |
| Dead Load | k/ft | 0.300 |
| Live Load | k/ft | 0.300 |

## Results

Beam OK

| | | |
|---|---|---|
| Mmax @ Cntr | k-ft | 3.87 |
| @ X = | ft | 5.00 |
| Mn * Phi | k-ft | 13.02 |
| Max @ Left End | k-ft | -7.75 |
| Mn * Phi | k-ft | 13.02 |
| Max @ Right End | k-ft | -7.75 |
| Mn * Phi | k-ft | 13.02 |
| | | Bending OK |
| Shear @ Left | k | 4.65 |
| Shear @ Right | k | 4.65 |

## Reactions & Deflections

| | | |
|---|---|---|
| DL @ Left | k | 1.50 |
| LL @ Left | k | 1.50 |
| Total @ Left | k | 3.00 |
| DL @ Right | k | 1.50 |
| LL @ Right | k | 1.50 |
| Total @ Right | k | 3.00 |
| Max. Deflection | in | -0.014 |
| @ X = | ft | 5.00 |
| Inertia : Effective | in4 | 634.22 |

## Shear Stirrups

| | | |
|---|---|---|
| Stirrup Rebar Area | in2 | 0.510 |
| Spacing @ Left | in | 5.00 |
| Spacing @ .2*L | in | 5.00 |
| Spacing @ .4*L | in | Not Req'd |
| Spacing @ .6*L | in | Not Req'd |
| Spacing @ .8*L | in | 5.00 |
| Spacing @ Right | in | 5.00 |

# Lintel Schedule

| load condition | min. lintel depth | max opening clear span | Dimension "A" | stirrup spacing | top & bottom bar size |
|---|---|---|---|---|---|
| supporting roof only | 12" | 8'-3" | 3'-0" | 5" | #5 |
| supporting roof only (engineered design) | 12" | 10'-0" | 4'-0" | 5" | #5 |
| supporting roof & wood frame above (eng. design) | 26" | 10'-0" | 4'-0" | 12" | #5 |
| supporting roof and wood frame above | 12" | 4'-7" | 3'-0" | 5" | #5 |
| roof and (1) ICF story above (eng design) | 26" | 10'-0" | 4'-0" | 12" | #6 |
| roof and (1) ICF story above | 12" | 5'-7" | 1'-4" | 5" | #5 |

Note: all stirrups are #3 bars

EXHIBIT 2

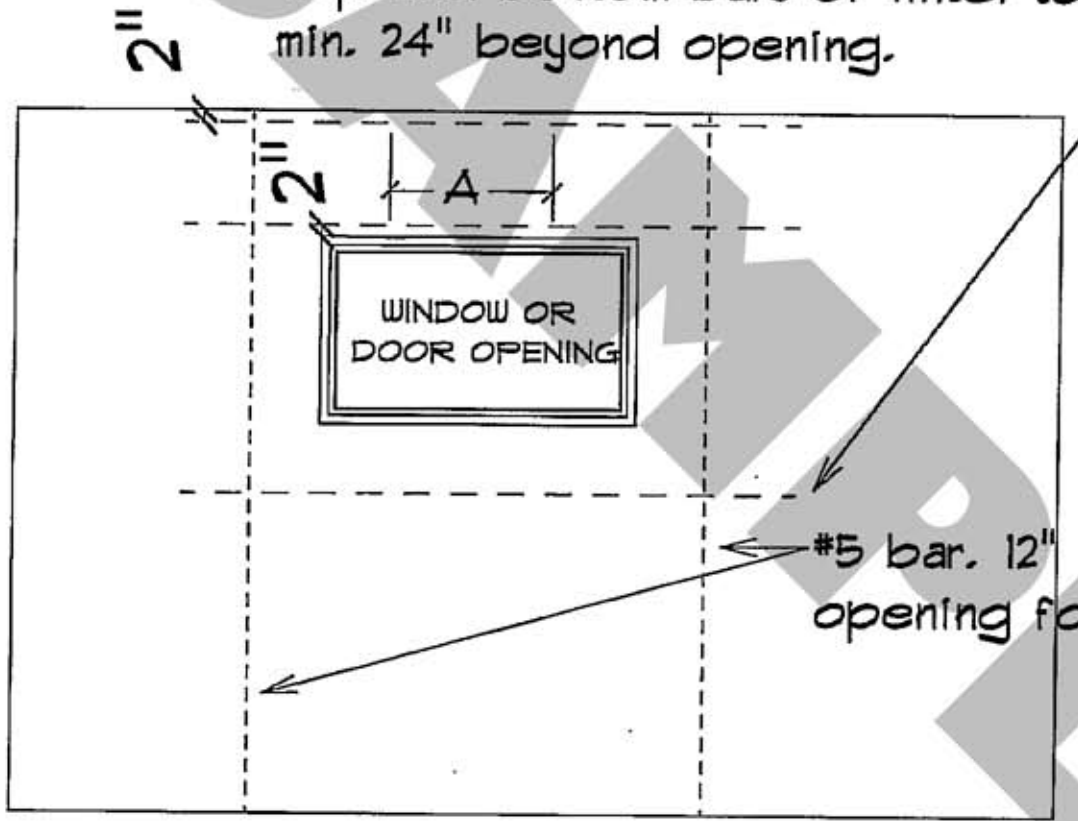
EXHIBIT 3

no stirrups in zone "A"

See lintel Schedule. for bar sizes

Min lintel depth = 8"

Top and bottom bars of lintel to extend min. 24" beyond opening.




## Opening Detail

EXHIBIT 4

Title :
Dsgnr:
Description :

Scope :

Job #
Date: 2:24PM, 10 SEP 10



# Multi-Span Concrete Beam



**Description** roof and light frame

## General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

| | | | | | |
|---|---|---|---|---|---|
| Fy | 60,000.0 psi | All Spans Considered as Individual Beams | | ACI Dead Load Factor | 1.40 |
| fc | 3,000.0 psi | Stirrup Fy | 40,000.0 psi | ACI Live Load Factor | 1.70 |

## Concrete Member Information

| Description | | | |
|---|---|---|---|
| Span | | ft | 10.00 |
| Beam Width | | in | 5.50 |
| Beam Depth | | in | 26.00 |
| End Fixity | | | Fix-Fix |
| Reinforcing | Center | Area | 0.31in2 |
| | | Bar Depth | 24.00in |
| | Left | Area | 0.31in2 |
| | | Bar Depth | 2.00in |
| | Right | Area | 0.31in2 |
| | | Bar Depth | 2.00in |

## Loads

| | | |
|---|---|---|
| Using Live Load This Span ?? | | Yes |
| Dead Load | k/ft | 0.600 |
| Live Load | k/ft | 0.860 |

## Results

Beam OK

| | | |
|---|---|---|
| Mmax @ Cntr | k-ft | 9.59 |
| @ X = | ft | 5.00 |
| Mn * Phi | k-ft | 32.55 |
| Max @ Left End | k-ft | -19.18 |
| Mn * Phi | k-ft | 32.55 |
| Max @ Right End | k-ft | -19.18 |
| Mn * Phi | k-ft | 32.55 |
| | | Bending OK |
| Shear @ Left | k | 11.51 |
| Shear @ Right | k | 11.51 |

## Reactions & Deflections

| | | |
|---|---|---|
| DL @ Left | k | 3.00 |
| LL @ Left | k | 4.30 |
| Total @ Left | k | 7.30 |
| DL @ Right | k | 3.00 |
| LL @ Right | k | 4.30 |
| Total @ Right | k | 7.30 |
| Max. Deflection | in | -0.003 |
| @ X = | ft | 5.00 |
| Inertia : Effective | in4 | 8,055.67 |

## Shear Stirrups

| | | |
|---|---|---|
| Stirrup Rebar Area | in2 | 0.220 |
| Spacing @ Left | in | 12.00 |
| Spacing @ .2*L | in | 12.00 |
| Spacing @ .4*L | in | Not Req'd |
| Spacing @ .6*L | in | Not Req'd |
| Spacing @ .8*L | in | 12.00 |
| Spacing @ Right | in | 12.00 |

EXHIBIT 5

Title :
Dsgnr:
Description :

Job #
Date: 2:24PM, 10 SEP 10

Scope :



# Multi-Span Concrete Beam



**Description** roof and (1) ICF story above

## General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

| | | | | | |
|---|---|---|---|---|---|
| Fy | 60,000.0 psi | All Spans Considered as Individual Beams | | ACI Dead Load Factor | 1.40 |
| f'c | 3,000.0 psi | Stirrup Fy | 40,000.0 psi | ACI Live Load Factor | 1.70 |

## Concrete Member Information

| Description | | | |
|---|---|---|---|
| Span | | ft | 10.00 |
| Beam Width | | in | 5.50 |
| Beam Depth | | in | 26.00 |
| End Fixity | | | Pin-Pin |
| Reinforcing | Center | Area | 0.44in2 |
| | | Bar Depth | 24.00in |
| | Left | Area | 0.44in2 |
| | | Bar Depth | 2.00in |
| | Right | Area | 0.44in2 |
| | | Bar Depth | 2.00in |

## Loads

| | | |
|---|---|---|
| Using Live Load This Span ?? | | Yes |
| Dead Load | k/ft | 1.130 |
| Live Load | k/ft | 0.660 |

## Results

Beam OK

| | | |
|---|---|---|
| Mmax @ Cntr | k-ft | 38.05 |
| @ X = | ft | 5.00 |
| Mn * Phi | k-ft | 45.61 |
| Max @ Left End | k-ft | 0.00 |
| Mn * Phi | k-ft | 45.61 |
| Max @ Right End | k-ft | 0.00 |
| Mn * Phi | k-ft | 45.61 |
| | | Bending OK |
| Shear @ Left | k | 15.22 |
| Shear @ Right | k | 15.22 |

## Reactions & Deflections

| | | |
|---|---|---|
| DL @ Left | k | 5.65 |
| LL @ Left | k | 4.30 |
| Total @ Left | k | 9.95 |
| DL @ Right | k | 5.65 |
| LL @ Right | k | 4.30 |
| Total @ Right | k | 9.95 |
| Max. Deflection | in | -0.025 |
| @ X = | ft | 5.00 |
| Inertia ; Effective | in4 | 5,642.38 |

## Shear Stirrups

| | | |
|---|---|---|
| Stirrup Rebar Area | in2 | 0.220 |
| Spacing @ Left | in | 12.00 |
| Spacing @ .2*L | in | 12.00 |
| Spacing @ .4*L | in | Not Req'd |
| Spacing @ .6*L | in | Not Req'd |
| Spacing @ .8*L | in | 12.00 |
| Spacing @ Right | in | 12.00 |