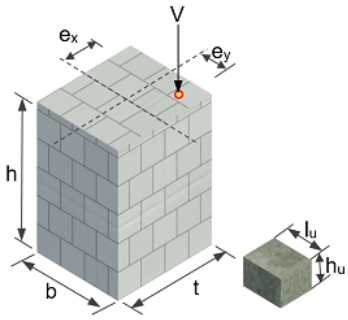
# 1.0 INPUT

## 1.1 Geometry

| | | | |
|---|---|---|---|
| Height | h | = | **3000** mm |
| Width | b | = | **500** mm |
| Thickness | t | = | **400** mm |

## 1.2 Masonry Properties

| | | | |
|---|---|---|---|
| Type | | | **Aggregate Concrete Blocks 25% or less formed voids** |
| Compressive Strength of Unit | $p_u$ | = | **2.9** N/mm$^2$ |
| Mortar Designation | M | = | **M12/(i)** |
| Height of Unit | $h_u$ | = | **200** mm |
| Least Horizontal Dimension of Unit | $l_u$ | = | **100** mm |




## 1.3 Masonry Construction

| | | | |
|---|---|---|---|
| Masonry Unit Category | MC | = | **Category I** |
| Construction Control Category | CC | = | **Normal** |

## 1.4 Design Loads

| | | | |
|---|---|---|---|
| Applied Factored Vertical Load | V | = | **25** kN |

### 1.4.1 Eccentricity

| | | | |
|---|---|---|---|
| Load Eccentricity along Thickness | $e_x$ | = | **20** mm |
| Load Eccentricity along Width | $e_y$ | = | **20** mm |

# 2.0 OUTPUT

Ref: BS 5628 - Part 1

| | | | | |
|---|---|---|---|---|
| Characteristic Compressive Strength | $f_k$ | = | **2.8** N/mm$^2$ | *Table 2* |
| Partial Safety Factor for Compression | $\Upsilon_m$ | = | **3.1** | *Table 4* |

## 2.1 Slenderness Check

| | | | | |
|---|---|---|---|---|
| Column Slenderness – Thickness | $\lambda_x$ | = | h / t = **7.5** | |
| Column Slenderness – Width | $\lambda_y$ | = | h / b = **6** | |
| Maximum Slenderness | $\lambda_{max}$ | = | max( $\lambda_x$, $\lambda_y$ ) = **7.5** | |
| Allowable Slenderness | $\lambda_{allow}$ | = | **27** | *Cl. 24.1* |

## 2.2 Capacity Reduction Factor

| | | | | |
|---|---|---|---|---|
| Additional Eccentricity - Thickness | $e_{ax}$ | = | max( 0, t * ((( h / t )$^2$ / 2400 ) - 0.015 )) = **3.4** mm | *Annex B* |
| Design Eccentricity - Thickness | $e_{mx}$ | = | max( abs( $e_x$ ), ( 0.6 * max( abs( $e_x$ ), 0.05 * t ) + $e_{ax}$ )) = **20** mm | |
| Additional Eccentricity - Width | $e_{ay}$ | = | max( 0, b * ((( h / b )$^2$ / 2400 ) - 0.015 )) = **0** mm | |

| | | | |
|---|---|---|---|
| Design Eccentricity - Width | $e_{my}$ | = max( abs( $e_y$ ),( 0.6 * max( abs( $e_y$ ), 0.05 * b ) + $e_{ay}$ )) = **20** mm | |
| Capacity Reduction Factor - Thickness | $\beta_x$ | = max( 0, 1.1 * ( 1 - ( 2 * $e_{mx}$ / t ))) = **0.99** | |
| Capacity Reduction Factor - Width | $\beta_y$ | = max( 0, 1.1 * ( 1 - ( 2 * $e_{my}$ / b ))) = **1.012** | |
| Design Capacity Reduction Factor | $\beta$ | = min( 1, $\beta_x$, $\beta_y$ ) = **0.99** | |

### 2.3 Design Vertical Load Resistance

| | | | |
|---|---|---|---|
| Plan Area of Column | A | = t * b = **0.2** $m^2$ | |
| Compressive Strength Correction Factor | c | = min( 1.0, 0.7 + ( 1.5 * A ) )= **1** | *Cl. 19.1.2* |
| Design Vertical Load Resistance | DVLR | = $\beta$ * t * b * c * $f_k$ / $\gamma_m$ = **178.8** kN | *Cl. 28.2.3* |
| Applied Stress | $v_s$ | = V / ( t * b ) = **0.125** $N/mm^2$ | |
| Allowable Stress | $v_a$ | = DVLR / ( t * b ) = **0.894** $N/mm^2$ | |

## 3.0 SUMMARY

| Description | Required | | Actual | | Status |
|---|---|---|---|---|---|
| Slenderness Limit | $\lambda_{allow}$ | <= **27** | $\lambda_{max}$ | = **7.5** | **PASS** |
| Allowable Load (kN) | V | >= **25** | DVLR | = **178.8** | **PASS** |
| Allowable Stress ($N/mm^2$) | $v_s$ | >= **0.125** | $v_a$ | = **0.894** | **PASS** |