

Index 641-010 Concrete Poles

Design Criteria

AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LRFDLTS-1); Structures Manual (SM), Volume 3, FDOT Modifications to LRFDLTS-1; **Structures Manual (SM)** Introduction, I.6 References; **FDOT Design Manual (FDM)**

Design Assumptions and Limitations

See **FDM 261** and **Structures Manual (SM)**, Volume 3 for additional design criteria.

The following computer-based design program is available for use on the **Structures Design Office Website**:

- *University of Florida Bridge Software Institute ATLAS Program v7 or higher.*

For Pole Types P-III through P-VIII, design poles within the following limits:

- 30 ft. ≤ Length (L) ≤ 65 ft.
- Pole Height (H) ≤ 50 ft.

Foundations may be designed assuming a 3'-6" diameter (See **Specification 641**). The minimum foundation depths for Concrete Poles are as follows:

- Pole Types P-III through P-V 7 feet
- Pole Types P-VI 8 feet
- Pole Types P-VII through PVIII 9 feet

Foundations are designed using the following soil criteria:

- Classification: Cohesionless (Fine Sand)
Friction Angle: 30 Degrees
Unit Weight: 50 lbs/cubic foot (assumed submerged)

For Pole Types P-II and P-III, nominal moment capacity may be estimated as:

$$M_n(\text{estimate}) = A_{ps} \cdot f_{pu} \cdot d_p \cdot \left[1 - 0.59 \left(\frac{A_{ps}}{b \cdot d_p} \right) \cdot \left(\frac{f_{pu}}{f_c} \right) \right]$$

Note: Refer to **LRFD Bridge Design Specifications** for definition of variables.

Determine maximum loads to be placed on poles, and select the required pole type meeting the requirements of **Table 641-1** (shown on the next page).

Plan Content Requirements

Complete the "*Strain Pole Schedule*" provided with the FDOT CAD Bar Menu, Linked Data Manager, and include in the Roadway Plans.

Signalization Plans:

See the [FDM 941](#). Include poles in "*Tabulation of Quantities*".

Table 641-1

Factored Flexural Resistance $M_r = \phi M_n^*$ at Finished Grade

| H (feet) | Type of Strain Pole | | | | |
|----------|---------------------|--------------|---------------|----------------|-----------------|
| | P-IV (kip-ft) | P-V (kip-ft) | P-VI (kip-ft) | P-VII (kip-ft) | P-VIII (kip-ft) |
| 20 | 84 | 150 | 184 | 263 | 350 |
| 22 | 88 | 155 | 190 | 271 | 359 |
| 24 | 92 | 161 | 195 | 279 | 368 |
| 26 | 96 | 166 | 201 | 286 | 378 |
| 28 | 100 | 172 | 207 | 294 | 387 |
| 30 | 104 | 178 | 212 | 301 | 397 |
| 32 | 109 | 183 | 218 | 309 | 406 |
| 34 | 113 | 189 | 224 | 316 | 415 |
| 36 | 117 | 195 | 229 | 324 | 425 |
| 38 | 121 | 200 | 235 | 332 | 434 |
| 40 | 125 | 206 | 241 | 339 | 443 |
| 42 | 130 | 212 | 246 | 347 | 453 |
| 44 | 134 | 217 | 252 | 354 | 462 |
| 46 | 138 | 223 | 257 | 362 | 471 |
| 48 | 142 | 228 | 263 | 369 | 481 |
| 50 | 146 | 234 | 269 | 377 | 490 |

* $M_r \geq M_u$

Payment

| Item number | Item Description | Unit Measure |
|-------------|----------------------------|--------------|
| 641-2-AB | Prestressed Concrete Poles | EA |

See the [BOE](#) and [Specification 641](#) for additional information on payment, pay item use and compensation.