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Section 1
Design of Monorail Systems
Introduction

Overhead monorails are primarily used to lift large or heavy items and move them horizontally. Monorails can be driven manually or powered. Power-operated overhead monorails systems are typically powered by air, hydraulics, or electricity. Overhead material handling systems can be supported on single or multiple girders and can be top-running or bottom-running. Bottom-running systems travel along the bottom flange of the supporting beam and are typically associated with monorails and bridge cranes. Multiple girders and top-running systems are typically not associated with monorails but rather with overhead or gantry bridge cranes. This course covers the basic design of a monorail with a bottom-running manually-driven trolley hoist on a single girder or beam.

The course will first discuss how monorails can increase productivity and efficiency, reduce injury to individuals, produce cost savings, and even improve quality. Operation safety and inspection of monorails will also be discussed since the actual design calculation of a monorail beam is only a portion of a well-planned overhead material handling system.

The procedure presented for the design of a monorail beam is primarily based on the Crane Manufacturers Association of America (CMAA) Specification No. 74 "Specifications for Top Running & Under Running Single Girder Electric Traveling Cranes Utilizing Under Running Trolley Hoist". Fatigue checks and deflection limitations will also be discussed. Connections and supports will only be briefly discussed. An example of a basic monorail beam design is provided to assist in better understanding of the information presented in this course.
Case Studies

Using monorails or other overhead material handling systems help increase productivity, efficiency, and safety while reducing costs and injury to personnel. Cases studies have shown that the use of such systems can do all of these things. Two case studies are presented below.

Case Study #1:

A company was showing an increase in employees with back injuries. Morale was low and insurance rates were increasing. Additionally, quality was an issue since 150 to 250-pound rolls requiring replacement 4 to 5 times daily were being dropped frequently by the two individuals performing the task. The addition of an overhead material handling system improved quality since rolls were no longer dropped during the replacement process, back injury to personnel was greatly reduced since lifting of heavy objects was eliminated, and, lastly, cost savings and increase in productivity were noted since the replacement process no longer required two individuals and took less time to perform.

Case Study #2:

A manufacturer of large and heavy mirrors had individuals injured often during the packaging process. Injury to personnel was occurring during the tilting and setting of the mirrors in shipping crates or when mirrors were dropped during this process. The packaging process took four individuals to complete the task. By installing an overhead material handling system, manually lifting the mirrors was no longer required, with reduced injuries. Improvement in cost savings, efficiency, and production occurred since less damage to or dropping of mirrors occurred and now only two individuals were required for the packaging task.

The two case studies presented show that overhead material handling systems could help reduce costs and injury while providing improvements in production, efficiency, and cost savings. One point to consider is insurance costs; with less individuals getting injured, the rising cost of insurance may be partially controlled. The case studies mentioned are summarized from studies found at various websites. The referenced websites provide various additional case studies showing similar results after the addition of an overhead material handling system.
Operation Safety

The safe operation of a monorail has some impact to the design of a monorail system. Engineers need to be concerned with the operational safety of the monorails they design. To that end, engineering drawings should include some or all of the items listed below:

- maximum lift design load
- safety, impact, or load factors used
- maximum angle or load due to side pull
- method and locations of labeling stating maximum capacity, warnings, etc.

Additionally, the engineer needs to have a full understanding of how the final monorail system is anticipated to be operated. Without operations input, a monorail can be poorly designed for the intended use, ultimately resulting in the death or injury of the operator and/or bystanders.

A safety plan for the operation of the monorail should be developed with input from all parties involved: owner/specifier, engineer, inspector, and operator. The plan should incorporate, at a minimum, the following information:

- Responsibility of all parties
- Design requirements (i.e., codes, safety or impact factors, labeling, etc.)
- General safety rules
- Operational rules or instructions
- Rigging requirements
- Inspections, Maintenance, and Testing
- Record keeping responsibilities

The Department of the Interior’s Safety Management Information System has a website that provides a written example of a crane and hoist operational safety plan. To assist in the development of a safety plan, this sample plan can be downloaded and is provided in a format that can be easily modified.

Operators also need to be properly trained to safely operate the monorail system. The following are methods that can be implemented to help ensure safe operation of the monorail:

- Proper training of operators and individuals in the area of use
- Use of check lists for inspection
- Scheduling of inspection (Interval based on level of use)
- Clear, unobstructed labels stating rated load on monorail beam and hoists
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The Hoist Manufacturers Institute (HMI) has created recommended practices for manual and powered hoists. The recommended practices list “Shall’s and Shall Not’s” for the operation of hoists. The documents provide valuable information and will assist in the development of an operational safety plan. A few of the items included in the recommended practices from HMI are listed below.

To avoid a potentially hazardous situation that could result in serious injury or death, the operator:

- SHALL NOT lift loads more than the rated load.
- SHALL NOT lift individuals if the systems is not rated for lifting of personnel
- SHALL NOT lift a load over people and SHALL assure other personnel stay clear of the load.
- SHALL be familiar with the operating controls, procedures, and warnings.

To avoid a potentially hazardous situation that could result in minor or moderate injury, the operator:

- SHALL avoid swinging the hook or load.
- SHALL inspect the hoist regularly
- SHALL NOT allow your attention to be diverted from operating the hoist.
- SHALL be familiar with the operating controls, procedures, and warnings.

Pre-planning

Remember the “Six ‘P’ principle”: Prior planning prevents pretty poor performance. Identifying all, or as many of, the design parameters in the initial stages of design allows for a better designed and operational system.

Some basic initial information and design criteria needed for the design of a monorail system includes:

- Design load rating or lift load
- Safety, load, or impact factors to use
- Design codes or other specifications
- Minimum clearances required
- Special requirements specific to the project
- Minimum or Maximum hook height
- Path of monorail
- Preferred method of support
- Connection types: welded or bolted
- Understanding of final use
Part of the pre-planning process is to determine the classification of the monorail, which is required for the fatigue design check of the monorail system.

**Monorail Classification**

The classification of the monorail is mainly required for checking fatigue. CMAA Specification No. 74 has four (4) classifications that are based on the level of service of the system.

The classifications are:

- **Class A** - Stand-by or Infrequent Service – Capacity load handled during installation and during infrequent maintenance.
- **Class B** - Light Service – Load varies from no load to the rated load and is lifted 2 to 5 times per hour and averaging 10 feet per lift.
- **Class C** - Moderate Service – Lifts 50% of rated load 5 to 10 times per hour and averaging 15 feet per lift.
- **Class D** - Heavy Service – Lifts 50% of rated load more than 10 times per hour.

In many cases, the classification can easily be determined; however, the code also provides a table that can used to determine the classification based on more detailed information: load classes and load cycles.

The four (4) load classes per the code are:

- **L1** - hoist normally lifts with very light loads and very rarely the rated load.
- **L2** - hoist normally lifts loads at 1/3 the rated load and rarely the rated load.
- **L3** - hoist normally lifts loads 1/3 to 2/3 the rated load and lifts the rated load fairly frequently.
- **L4** - hoist regularly lifts close to the rated load.

The four (4) load cycles per the code are:

- **N1** - 20,000 to 100,000 cycles – irregular use followed by long idle periods.
- **N2** - 100,000 to 500,000 cycles – regular use in intermittent operations.
- **N3** - 500,000 to 2,000,000 cycles – regular use in continuous operations.
- **N4** - over 2,000,000 cycles – regular use in severe continuous operations.

How the classification of the system is used for fatigue checks will be covered later in this course.
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Design Considerations

Clearances

Dimensions of the largest and heaviest items to be lifted are required in order to assure that proper access is provided along the entire path of the monorail.

CMAA provides minimum clearance requirements of 2 to 3 inches at different locations along the monorail. Use of larger clearances is recommended to account for any unknowns, deflection of other items or supporting structure in the area, and to allow for more flexibility during installation and future uses.

Support locations

Support locations are determined based on (and not limited to) the following:

- Combined axial and bending stresses
- Fatigue allowable stress range
- Deflection limitations
- Maximum beam height allowed - the span may need to be shortened if a deeper beam cannot be used to reduce stresses or if deflections result in clearance problems.

The design of the monorail beam along with the supports and connections can be an iterative process. However, the design of the supports is not within the scope of this course.

Connections

Bolted and/or welded connections can be used on a monorail. The type of connection may be driven by the owner's specification, costs, and constructability. The CMAA code provides guidance for the fatigue check of a welded connection. For bolted connections, AISC's ASD and LRFD (Latest Editions) list bolt capacities for strength checks.\(^1\)\(^2\) For fatigue of bolted connections, AISC LRFD (Last Edition) provides some guidance. The design of connections is not within the scope of this course.

Deflection Limitation

The vertical deflection of the monorail beam shall be limited to L/450. A tighter limitation should be used if required by the project specifications. The L/450 limitation shall apply to all beams including cantilever beams. The lateral deflection of the beam should also be considered.
Material and Structural Shapes

The most common shape utilized for the design of monorails with under hung hoists is the S-shape. The S-shape sections have narrow flange widths but also thicker flanges compared to equivalent W-shape sections. Monorails can also be designed using W-shape sections; however, the local bending of the bottom flange due to the wheel loads governs the design of the beam more often.

ASTM A36 ($F_y = 36$ ksi) is the most common material readily available for S-shape sections. ASTM A992 ($F_y = 50$ ksi) is now more common for W-shape sections. Recently, ASTM revised the A992 specification to include shapes other than W-shape; however, S-shapes are not yet readily available in A992.

Loads Defined

The loads as defined by the CMAA specification are as follows:

- **Dead Load (DL)**: The weight of the monorail beam and any other fixed item supported by the beam.
- **Trolley Load (TL)**: The weight of the trolley and any other equipment attached to the trolley.
- **Lifted Load (LL)**: The weight of the item lifted along with all associated lift devices such as slings, shackles, spreader beams, etc.
- **Collision Forces (CF)**: Loading resulting from the collision with another trolley or bumper stop. The velocity and mass of the objects are required to determine the kinetic energy released during the collision.
- **Inertia Forces from Drives (IFD)**: Forces occurring during the acceleration, deceleration, and motions of the monorail.
- **Operating Wind Load (WLO)**: The loading on the projected area exposed to the wind. The wind velocity at which a safe lift should be used as specified by the owner/specifier. The code states that a minimum of 5 psf loading should be used if no information is provided.
- **Stored Wind Load (WLS)**: The maximum wind applied to the monorail when the system is *not* in use.
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Forces due to Skewing (SK)

Horizontal forces normal to the beam when wheels roll along the length of the beam. A table provided in the code is used to determine a factor to be applied to the wheel loads.

Additional Loads to Consider

The monorail beam should also be designed for in-line (axial) and out-of-plane (lateral) loading. AISC ASD states that a minimum of 10% of the load shall be applied in-line or longitudinally and a minimum of 20% of the load shall be applied normal to or perpendicular to the beam. The load used in the calculations should be based on the lift load and the trolley weight with all load factors applied.¹

Torsional moment caused by the out-of-plane loading should also be accounted for in the design. The moment is determined by multiplying the lateral load by the vertical distance between the beam’s shear center and the centerline of the load. The load is generally assumed to be applied at the bottom flange for bottom-running trolleys; therefore, for a standard S-beam or I-beam, the distance is one-half (1/2) the beam depth. To determine the torsional stress on the beam, AISC’s Steel Design Guide Series 9: Torsional Analysis of Structure Steel Members can be referenced. The stresses are determined using the section modulus of one flange only.¹⁰ The example at the end of this course will provide further guidance.

Load Factors

Load factors are used to account for such items as impact and dynamic lift situations, or to account for unknowns. The load factors discussed below are as defined by the CMAA code; however, these factors can be adjusted to account for the specific design situation being investigated.

Dead Load Factor (DLF)

This factor covers the dead loads of the trolley hoist and any associated equipment. The factor is based on the travel speed of the trolley and is determined using Equation 1.

\[ DLF = 1.10 \leq 1.05 + \frac{TravelSpeed}{2000} \leq 1.20 \]  

(Eq. 1)

where TravelSpeed is in feet per minute (fpm).

For a powered trolley, the minimum dead load factor is 1.10. For a trolley that is manually-driven, the travel speed is relatively low so Equation 1 is not required. A factor of 1.05 to 1.10 should be utilized to account for some unknowns such as mill and weld tolerance.
Note that the Dead Load factor (DLF) accounts for the dead load of the beam (DL), trolley and associated equipment (TL), while the term “Dead Load (DL)” introduced in the previous section only refers to the dead load of the beam. It is important to note this distinction since the nomenclature can be somewhat confusing.

**Hoist Load Factor (HLF)**

This factor accounts for the motion of the rated load in the vertical direction. The factor also accounts for inertia and mass forces due to sudden impact load during lifting. The factor is also a catch-all accounting for all other uncertainties. The HLF factor is determined using Equation 2.

\[ HLF = 1.15 \leq 1 + .005 \times HoistSpeed \leq 1.50 \]  
\[ \text{where } HoistSpeed \text{ is in feet per minute (fpm).} \]

For manually-driven trolleys, the load is typically hoisted without the use of power thereby the hoist speed is relatively low. Therefore, Equation 2 may be ignored and a minimum factor of 1.10 to 1.15 can be used.

**Load Combinations**

The CMAA specification requires that combined stresses be checked for three different stress levels. The three (3) load combinations requiring evaluation are:

- **Case 1** - Monorail in regular use under principle loading (Stress Level 1).
  \[ (DL \times DLF) + (TL \times DLF) + (LL \times HLF) + IFD \]  
  (Eq. 3)

- **Case 2** - Monorail in regular use under principle loading and additional loading (Stress Level 2). This is similar to Case 1 with the addition of operating wind loading and skewing forces
  \[ (DL \times DLF) + (TL \times DLF) + (LL \times HLF) + IFD + WLO + SK \]  
  (Eq. 4)

- **Case 3** - Monorail under extraordinary loading (Stress Level 3). There are two conditions evaluated for this case.
  - **Case 3a** - Monorail not in use and Stored Wind Load.
    \[ DL + TL + WLS \]  
    (Eq. 5)
  - **Case 3b** - Monorail collision.
    \[ DL + TL + LL + CF \]  
    (Eq. 6)
Allowable Stresses

Table 1 lists allowable stresses for the three (3) stress levels. The allowable compression stress listed in the table is for beam not subject to buckling. $F_y$ noted in the table below is the minimum yield strength of the beam material.

<table>
<thead>
<tr>
<th>Stress Level</th>
<th>Axial Compression Allowable (*) $F_a$</th>
<th>Axial Tension Allowable $F_a$</th>
<th>Shear Allowable $F_v$</th>
<th>Bearing Allowable $F_{br}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.60 $F_y$</td>
<td>0.60 $F_y$</td>
<td>0.35 $F_y$</td>
<td>0.75 $F_y$</td>
</tr>
<tr>
<td>2</td>
<td>0.66 $F_y$</td>
<td>0.66 $F_y$</td>
<td>0.375 $F_y$</td>
<td>0.80 $F_y$</td>
</tr>
<tr>
<td>3</td>
<td>0.75 $F_y$</td>
<td>0.75 $F_y$</td>
<td>0.43 $F_y$</td>
<td>0.90 $F_y$</td>
</tr>
</tbody>
</table>

* For beams subject to buckling, the axial compression allowable stress shall be as defined by Equations 7 and 9.

** Compression and Tension allowables are also utilized for bending allowables about the major and minor axis of the beam.

For a beam subject to buckling due to compression loading, the average allowable compressive stress on the cross sectional area is defined below. For axial allowable calculations below, the larger $KL/r$ value calculated from each the major and minor axis of the beam shall be used.

When $KL/r \leq C_c$ then

$$F_a = \frac{1 - \left(\frac{KL}{r}\right)^2}{N \left[ \frac{5}{3} + \frac{3(KL/r)}{8C_c} - \frac{(KL/r)^3}{8C_c^3} \right]} F_y$$  \hspace{1cm} (Eq. 7)

where $C_c$ is defined as

$$C_c = \sqrt{\frac{2\pi^2 E}{F_y}}$$  \hspace{1cm} (Eq. 8)

and $F_a = \text{allowable axial stress (ksi)}$  
$K = \text{effective length factor}$  
$L = \text{unbraced length of compression member}$  
$r = \text{radius of gyration of the member}$  
$E = \text{modulus of elasticity (ksi) (29,000 ksi for steel)}$  
$N = \text{constant. Use 1.10 for Stress Level 1 cases. Use 1.00 for Stress Level 2 cases Use 0.89 for Stress Level 3 cases.}$
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When $KL/r > C_c$ then

$$F_a = \frac{12\pi^2 E}{N(23)(KL/r)^2}$$  \hspace{1cm} (Eq. 9)

**Interaction Equations**

Members subject to combined axial and bending stress shall meet the following requirements.

$$\frac{f_a}{F_a} + \frac{C_{mx}f_{bx}}{F_{ex}} + \frac{C_{my}f_{by}}{F_{ey}} \leq 1.0$$  \hspace{1cm} (Eq. 10)

$$\frac{f_a}{F_{ax}} + \frac{f_{bx}}{F_{bx}} + \frac{f_{by}}{F_{by}} \leq 1.0$$  \hspace{1cm} (Eq. 11)

When $f_a/F_a \leq 0.15$, then equation 12 may be used in lieu of Equations 10 and 11.

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} + \frac{f_{by}}{F_{by}} \leq 1.0$$  \hspace{1cm} (Eq. 12)

where

- $f_a = \text{actual axial stress (ksi)}$
- $f_{bx} = \text{actual bending stress about major axis (ksi)}$
- $f_{by} = \text{actual bending stress about minor axis (ksi)}$
- $F_a = \text{allowable axial stress (ksi)}$
- $F_{ax} = \text{allowable axial stress per Table 2 (ksi)}$
- $F_{bx} = \text{allowable bending stress about major axis (ksi)}$
- $F_{by} = \text{allowable bending stress about minor axis (ksi)}$
- $C_{mx}$ and $C_{my}$ is a reduction factor (reference CMAA specifications or AISC for additional information)

and where

$$F_{ex} = \frac{12\pi^2 E}{N(23)(KL/r)^2}$$  \hspace{1cm} (Eq. 13)

$$F_{ey} = \frac{12\pi^2 E}{N(23)(KL/r)^2}$$  \hspace{1cm} (Eq. 14)
Local Bending of Bottom Flange

The local bending of the bottom flange of the beam or girder due to the wheel load is an often overlooked design check. S-beams are the most common shape used for monorails; however, I-beams are sometimes used. Since the flange thickness of an I-beam is thinner than an equivalent S-beam, the local bending of the bottom flange of the I-beam could control the design of the monorail beam.

The wheel load is determined using basic static analysis, where in many cases it is one-fourth (1/4) the lift load with load factor applied. The wheel load is generally considered to be a concentrated load applied at the center of the wheel contact with the flange (see Figure 1).

![Figure 1: Wheel Contact on Bottom Flange](image)

The CMAA code provides guidance for checking the wheel load on both an S-beam and I-beam. In addition to checking the stress caused by one wheel load, the stress between the wheels on one side of the beam should be checked. In many cases, the wheel spacing longitudinally is short so the stress from the two wheels may be high between the two contact points. Roark’s *Formula for Stress and Strain* is a good reference for determining this stress.9

Fatigue Design

Fatigue problems occur in monorails due to the repeated loading and unloading of the system. A Class A monorail will likely not have fatigue problems due to infrequent usage. On the other hand, a Class D monorail design could possibly be governed by fatigue since its usage is very frequent.
How is Fatigue checked?

Fatigue is checked by determining the maximum stress range encountered by the beam and checking if it does not exceed the allowable stress range. The maximum stress range is the maximum stress (fully loaded condition) minus the minimum stress (unloaded condition).

\[
UR_{fatigue} = \frac{Maximum\ stress\ range}{Allowable\ stress\ range} \leq 1.0 \quad (Eq.\ 15)
\]

Fatigue Allowables

The CMAA code provides a table with allowable stress ranges based on two factors: (1) service classification previously discussed and (2) joint category. Six (6) categories (Category A through F) cover various conditions and connection types. Category A is the least severe while Category F is the most severe category.

CMAA Specification No. 74 provides a table listing various conditions for each category. Additionally, the code provides figures that can be referenced to quickly determine which category is applicable. Table 2 below provides an example for each of the six categories.

<table>
<thead>
<tr>
<th>Joint Category</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>base metal of non-built-up members (i.e., standard rolled shapes)</td>
</tr>
<tr>
<td>B</td>
<td>base metal or weld metal in a complete joint penetration groove welded splices of rolled and welded sections of similar profiles with welds grounded and passes nondestructive testing (NDT)</td>
</tr>
<tr>
<td>C</td>
<td>similar to Category B except splice occurs where transitions of thickness or width where slopes are no greater than 1:2.5 ratio</td>
</tr>
<tr>
<td>D</td>
<td>base metal at the net section of bolted connections</td>
</tr>
<tr>
<td>E</td>
<td>base metal of axially loaded members with fillet welded end connections</td>
</tr>
<tr>
<td>F</td>
<td>fillet weld metal</td>
</tr>
</tbody>
</table>
Using the service classification and the joint category, the allowable stress range can be determined. Table 3 lists the allowable stress range for each service classification for each category. On a Service Class A system, for comparison purposes, a Joint Category F has an allowable stress range of 15 ksi as compared to 63 ksi for a Joint Category A.

Table 3: Allowable Stress Range

<table>
<thead>
<tr>
<th>Service Class</th>
<th>Category A</th>
<th>Category B</th>
<th>Category C</th>
<th>Category D</th>
<th>Category E</th>
<th>Category F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>63</td>
<td>49</td>
<td>35</td>
<td>28</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>50</td>
<td>39</td>
<td>28</td>
<td>22</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>C</td>
<td>37</td>
<td>29</td>
<td>21</td>
<td>16</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>D</td>
<td>31</td>
<td>24</td>
<td>17</td>
<td>13</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

Example

An existing monorail requiring recertification is located over a heavy piece of equipment. The monorail is used very rarely for maintenance or replacement of heavy components. As part of a safety plan being implemented, the owner is in need of determining the monorail beam’s capacity and labeling it accordingly. The existing monorail is composed of an S10x25.4 beam spanning (“L”) 11-feet between support hangers and has a yield strength \( F_y \) of 36 ksi. The monorail beam was not labeled with its capacity. The existing manually-driven bottom-running trolley is labeled as having a 2-ton capacity and weighs 250 pounds. The monorail is located where it is protected from the wind. For this example, the support hangers, supporting structure and connections need not be checked.

Sketch of Existing Monorail System
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Since the trolley is manually-driven, IFD and CF loads will be ignored due to the relatively low velocity. Wind loading (WLO and WLS) can also be ignored since the existing monorail is located in a protected area. Therefore, only Case 1 (Stress Level 1) needs to be evaluated; hence, Equation 3 can be modified as follows:

\[
(DL \times DLF) + (TL \times DLF) + (LL \times HLF)
\]

Based on the requirements, the following deductions can be made:

- The beam will be checked as a simply supported member; therefore, use \( K = 1.00 \) in \( KL/r \) calculations.
- Dead load factor (DLF): A factor of 1.05 typically accounts for coating weight plus mill & weld tolerance. However, since other miscellaneous appurtenances (such as stops at each end) are present, a factor of 1.10 will be utilized.
- Hoist load factor (HLF): The hoisting of the load is performed manually; therefore, the hoist speed is relatively slow. A factor of 1.10 will be used in this example since the lift load is relatively low. A higher factor is justifiable for higher lift loads.
- The monorail system’s classification is Class A since it is rarely in service.
- Allowable fatigue stress range from Table 3 is 63 ksi.
- Based on a \( F_y \) of 36 ksi and using Equation 8, \( C_c \) equals 126.1.
- Since Case 1 or Stress Level 1 is being investigated, then the constant \( N \) equals 1.10.

**Loads**

The uniform load \( (w) \) is the weight of the beam with the appropriate load factor. Therefore, \( w = 1.10 \times 25.4 = 27.94 \text{ lb/ft} \).

The point load \( (P) \) applied at the midspan of the beam is the lift load plus the trolley weight with appropriate load factors applied. Since all factors are 1.10, then \( P = 1.10 \times (4000 + 250) = 4675 \text{ lb} \).

Per AISC ASD, the axial load \( (P_{ax}) \) is 10% of the point load \( (P) \) and the lateral load \( (P_{Lat}) \) is 20% of the point load \( (P) \). Therefore, \( P_{ax} = 0.10 \times P = 467.50 \text{ lb} \) and \( P_{Lat} = 0.20 \times P = 935 \text{ lb} \).

**Determine Axial Stress and Allowable**

Since the beam area of the S10x25.4 is 7.46 in\(^2\), the actual axial stress \( (f_a) \) is \( P_{ax}/7.46 = 0.06 \text{ ksi} \).
In order to determine the axial allowable, \( KL/r \) needs to be determined. \( KL/r \) for the major and minor axis is 32.43 and 138.37 respectively. The \( KL/r \) to use is the maximum of two values; hence, \( KL/r \) is 138.37. Since \( KL/r \) is greater than \( Cc \), then Equation 9 is used to determine the axial allowable stress resulting in \( F_a = 7.09 \text{ ksi} \).

The interaction equation used to evaluate the combined stresses of the beam is based on the ratio of the actual axial stress to the allowable stress \( (f_a/F_a) \). Since this ratio is 0.009 and is less than 0.15, then only Equation 12 needs to be evaluated to determine the interaction ratio (or unity ratio).

Determine Bending and Torsional Moments

Bending about the major-axis of the beam is calculated for the uniform beam dead load with load factor applied and the point load applied at the midspan of the beam. Therefore, the major-axis bending moment (or in-plane bending) is

\[
M_{ipb} = \frac{1}{8} wL^2 + \frac{1}{2} PL = 5.071 + 154.275 = 159.346 \text{ in kips}
\]

Bending about the minor-axis of the beam is determined using the lateral load applied at the midspan of the simply supported beam.

\[
M_{opb} = \frac{1}{4} P_{Lat} L = 30.855 \text{ in kips}
\]

The torsional moment is determined by applying the lateral load at the bottom of the beam times one-half the beam depth.

\[
M_{tor} = P_{Lat} \frac{\text{Depth}}{2} = 4.675 \text{ in kips}
\]

Determine Bending Stresses

The bending stresses are determined using the bending moments divisible by the approximate section modulus of the beam (i.e., \( M/S \)). For an S10x25.4, \( S_x = 24.7 \text{ in}^3 \) and \( S_y = 2.91 \text{ in}^3 \). The stress caused by the torsional moment is additive to the minor axis bending stress and is calculated using the section modulus of the flange of the S-beam. With the properties of the flanges of the S-beam being 4.661 inches wide by 0.491 inches, the section modulus \( (S_{fl}) \) is determined to be \( \frac{1}{6} bt^2 = 1.778 \text{ in}^3 \).

Therefore, the bending stresses are

\[
f_{bx} = \frac{M_{opb}}{S_x} = 6.451 \text{ ksi}
\]

\[
f_{by} = \frac{M_{opb}}{S_y} + \frac{M_{tor}}{S_{fl}} = 13.233 \text{ ksi}
\]
Bending Allowables

Based on Table 1, the bending allowable using Case 1 (Stress Level 1) is $0.60 \times F_y$ for both the major and minor axis of the S-beam.

$$F_{bx} = F_{by} = 0.60F_y = 21.60 ksi$$

Interaction Equation

As previously mentioned, the unity ratio of the monorail beam is determined using Equation 12.

$$UR = \frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} + \frac{f_{by}}{F_{by}} = 0.920$$

With the unity ratio being less than 1.00, the beam is capable of supporting the 2-ton required lift load. Deflection, fatigue, and local bending of the bottom flange must now be examined.

Local Bending of the Bottom Flange

Since this design check was not covered in detail in this course, the calculations will not be shown. Calculations were performed and the local bending stresses of the bottom flange were well within acceptable values for the specified design lift load.

Check Deflection

With a deflection allowable of $L/450$, the beam deflection can not exceed 0.293 inches. Using the deflection equations for a simply supported beam, the actual vertical deflection of the S10x25.4 beam with no load factors applied is

$$\Delta = \frac{5wL^4}{384EI_x} + \frac{PL^3}{48EI_x} = 0.059\text{ inches}$$

where the first component is the deflection due to the beam’s own weight and the second component is the lift load plus trolley weight located at the midspan of the beam. The value of the variables used are $w=25.4\text{ lb/ft}$, $L = 11\text{ feet}$, $E = 29000\text{ ksi}$, $I_x = 124\text{ in}^4$, and $P = 4250\text{ lb}$ (all units must be converted to pounds and inches prior to substitution). Since 0.059 inches < 0.293 inches, the beam deflection is adequate.

Check Fatigue

Fatigue is checked by finding the maximum stress range encountered by the beam and comparing it to the allowable range. The maximum stress range for this simply supported beam is calculated by taking the beam stress encountered during the lifting of the maximum load and subtracting the beam stress for the unloaded
condition (i.e., stress caused by the beam’s weight only). From the previous calculations, the maximum in-plane bending stress is 6.451 ksi (without subtracting the unloaded condition). As was initially determined, the allowable stresses range for this monorail is 63 ksi. Since 6.451 ksi is far less than the 63 ksi allowable, no further calculations are necessary as the monorail meets the fatigue criteria using this initial conservative check.

**Important Points**

The purpose of this course is to present a basic concept for the design of a single girder monorail system for bottom-running manually-driven trolley hoists. The concept and procedures were presented in a matter that it is useful for a general audience as well for civil or structural engineers performing such designs. At the end of this course, the reader should understand the following points:

- A properly designed monorail system requires adequate pre-planning.
- A monorail can increase productivity and safety while reducing costs and injury to personnel.
- An operational safety plan is an important element in a properly planned and designed monorail system.
- The monorail classification helps determine the maximum allowable stress range for use in fatigue checks.
- The design of a monorail requires consideration of various load types and combinations.

**Disclaimer**

The material presented in this course is intended only for general familiarization with the subject matter and for educational purposes. The course does not cover all aspects of the subject. Use of this material in any manner whatsoever shall only be done with competent professional assistance. The author provides no expressed or implied warranty that this material is suitable for any specific purpose or project and shall not be liable for any damages including but not limited to direct, indirect, incidental, punitive and consequential damages alleged from the use of this material.
Design of Monorail Systems
Tomas H Orihuela Jr, PE

References

6. Gorbel, Inc. website (www.gorbel.com). Gorbel is a manufacturer of overhead material handling equipment. This author has no association with Gorbel, Inc.
8. Hoist Manufacturers Institute (HMI) website (HMI’s website is part of MHIA’s website (see reference 4). “Shall’s and Shall Not’s for Hand Chain Manually Operated Chain Hoists”. This document is for free download at website available in PDF format.

Additional Resources

The references below are provided for the reader as additional sources for the design of monorails and other overhead material handling systems:

1. ASME/ANSI B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)."
2. ASME/ANSI B30.9, "Slings."
5. ASME/ANSI B30.16, "Overhead Hoists (Underhung)."
6. ASME/ANSI B30.17, "Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)."
8. ASME/ANSI B30.21, "Manually Lever Operated Hoists."
12. CMAA Specification No. 70, Specifications for Electric Overhead Traveling Cranes.
13. NFPA 70, Article 610, Cranes and Hoists.
Section 2
Engineering Disasters: The Kansas City Hyatt Catwalk Collapse
Prologue

The mood was festive in the huge atrium of the Kansas City Hyatt Regency hotel on a warm summer night in July, 1981. More than 1,500 people were enjoying a weekly dance contest called the “Tea Party” hosted by a local radio station.

Sally Firestone was all dressed up, standing on a catwalk above the atrium floor, watching the dancers below. Suddenly, she heard a loud “crack.” Then, her world came crashing down around her. As the band played Duke Ellington’s “Satin Doll,” catwalks lined with people on the second and fourth floor above the atrium fell onto the dance floor below.

The deadliest structural failure in U.S. history killed 114 people and injured nearly 200 others. Ms. Firestone lay unconscious and trapped for hours under the debris. She was eventually rescued, but was left a quadriplegic.

“I’m not really bitter. I’m just amazed that no one discovered the problems with the building,” said Firestone many years later. “So many things happened along the way that should have been caught.”

Introduction

As Kansas City Mayor Richard Berkley stood in front of the Hyatt Regency shortly after the accident, he called it a “very serious tragedy.” But, what made this disaster even more tragic was that it should never have happened.

The collapse of the skywalks resulted from a simple design error. In 1981, there was nothing particularly complex about designing skywalks that hang from the ceiling, supported by rods. At the time, the engineer of record for the Kansas City Hyatt Regency hotel project had many previous years of experience designing structures. Yet, the design error was so simple that a junior or senior undergraduate engineering student could have recognized it.

And there were numerous opportunities for the design error to be caught during design and construction.

This course will examine the events that led up to and caused the Kansas City Hyatt disaster. We’ll see how negligence and lack of design responsibility by the engineer of record was the direct cause of the accident. We’ll see how constructability issues led to an ill-fated design change by the fabricator. And
we'll learn how the lack of a change management process for shop drawings contributed to the tragedy.

Finally, we'll discuss lessons learned from this accident that you can take forward with you in your professional practice.

Project History

In 1976, Crown Center Redevelopment Corporation initiated a project to design and build a Hyatt Regency Hotel in Kansas City, MO. Gillum-Colaco, Inc. was selected as the consulting structural engineer for the project. Gillum-Colaco subcontracted the structural engineering work for the project to their subsidiary firm, Jack D. Gillum & Associates (G.C.E.).

PBNDML Architects, Planners, Inc. was selected as the architect for the project. Eldridge Construction Company was selected as the general contractor; and they in turn subcontracted the fabrication and erection of the hotel's atrium steel to Havens Steel Company.

The project employed three distinct “teams,” each with different roles. The “design team,” consisting of PBNDML and G.C.E., was authorized to control the entire project on behalf of the owner. Eldridge Construction Co., acting in the role of the “construction team” was responsible for general contracting. And the “inspection team” was made up of two inspection agencies, H&R Inspection and General Testing, as well as a quality control manager, a construction manager and an investigating engineer.

The proposed Kansas City Hyatt Regency Hotel consisted of three sections: a 40-story tower section, a function block, and a connecting atrium. The atrium, where the accident occurred, is a large open area approximately 117 feet wide x 145 feet long x 50 feet high. Three suspended “skywalks” spanned the atrium at the 2nd, 3rd and 4th floor levels. The 3rd and 4th floor walkways were each suspended from the atrium roof trusses, while the 2nd floor walkway was located directly underneath the 4th floor walkway and was suspended from the 4th floor walkway (see Figure 1 after the collapse showing the dangling 4th floor walkway rods to the right in the picture).
As is fairly typical for these types of projects, the architect, PBNDML, prepared the project specifications and G.C.E., the structural engineer, was responsible for producing structural engineering drawings. Havens, the atrium fabrication contractor, used G.C.E.'s structural engineering drawings as the basis to create shop fabrication drawings.

**G.C.E.'s Original Design**

The Kansas City Hyatt atrium catwalk design prepared by G.C.E. intended for the 2nd floor and 4th floor walkways to be suspended one under the other from six single continuous 1 ¼” diameter round steel rods anchored in the ceiling. The 3rd floor walkway was to be located east of the 2nd and 4th floor walkways and was to be suspended from the atrium ceiling in the same manner.

The box beam members that formed the lateral structural support for each walkway were comprised of two (2) 8 x 8.5 MC channels welded toe-to-toe (see Figure 2a on the next page).

On the 2nd and 4th floor walkways, the rods were intended to run from the ceiling down to and through the 4th floor box beams and were then to continue down to and through the 2nd floor box beams, where the rods would terminate with a nut and washer. The ends of the rods were depicted as threaded so that the walkways could be leveled by adjusting the nuts on the threaded rods.

A total of 60 structural design drawings were prepared by G.C.E. and were transmitted to Havens through the normal document transmittal process. The project engineer for G.C.E. had prepared preliminary sketches for the atrium walkways showing design criteria, including calculated preliminary loads and information on the box beam hanger rod connection; however these preliminary sketches were not transmitted to the fabricator along with the structural drawings.

**Design Change**

From Havens’ perspective, there were two problems with G.C.E.’s design. First, the long rods required to hang the 2nd floor catwalk from the atrium ceiling were not readily available. Building the walkways per the G.C.E. design would have resulted in material delays that could have potentially impacted the overall project schedule.
Secondly, the original design would have required threading the entire length of the long rod in order to install a nut under the 4th floor catwalk box beam. The nut for the 4th floor catwalk box beam would have to be installed after inserting the rod through the 2nd floor catwalk box beam, and would likely have required extensive scaffolding to complete the connection. This would have resulted in significantly higher erection costs. Further, Havens was concerned that the threads on the rod might be damaged during the erection process.

Therefore, Havens changed from a single to a double hanger rod box beam connection at the 4th floor catwalk (see Figure 2b). A rod was hung from the ceiling down to the 4th floor walkway. And a second rod was hung from the 4th floor walkway down to support the 2nd floor walkway. This allowed the use of shorter rods, which were readily available. It also simplified the erection process and eliminated the need for the entire rod to be threaded.

Havens claims to have called G.C.E. to “red flag” the connection design change. G.C.E. claims that the call was never made. Regardless of the disputed phone call, the change was reflected on Havens’ shop drawings and erection drawings, which were forwarded to G.C.E. On February 26, 1979, G.C.E. returned the drawings to Havens, stamped with the project engineer’s engineering review seal, authorizing construction.
Roof Collapse

On October 14, 1979, while the hotel was still under construction, part of the atrium roof collapsed. Fortunately, it was a Sunday, and there was no construction activity occurring at the time, so there were no injuries.

The owner used resources from the project’s “inspection team” to investigate the roof collapse. Additionally, the owner hired an independent engineering firm, Seiden-Page, to determine the cause. The investigation determined that the roof collapse occurred due to faulty roof connections. The problem was fixed. However, the owner did not direct or ask Seiden-Page to check the walkway connections or any other structural details on the project.

As a result of the roof collapse, G.C.E. wrote the owner stating that G.C.E. would begin a thorough design check of all steel connections in the design. Construction on the project continued, and the hotel opened for business in July, 1980.

The Accident

On July 17, 1981, just one year after the hotel opened, the load resulting from people standing on the walkways caused one of the connections at the 4th floor walkway to fail. Due to a lack of redundancy in the design, the connection failure resulted in the collapse of the 4th floor walkway onto the 2nd floor walkway, which then collapsed onto the floor below.

The collapse of the walkways fractured water pipes in the atrium, which flooded the hotel’s main entrance. Nonetheless, rescue efforts were swift and well coordinated. More than 40 rescue vehicles quickly converged on the scene from all over the Kansas City metropolitan area and helicopters were used to take the injured to area hospitals. Aiding the rescue efforts were scores of doctors in town for a Radiology convention who happened to be dining in the hotel at the time of the accident.

The accident killed 114 people and injured nearly 200 others, making it the deadliest structural failure in U.S. history.*

* Note: This claim is debatable since the collapse of the World Trade Center Towers on September 11, 2001 resulted in a much higher death toll. However, most experts do not categorize the WTC collapse as a structural “failure” because the buildings were never intended to be designed for such a terrorist attack. By contrast, the Kansas City building code mandated that the Hyatt walkways be designed for the live load conditions that existed on the night of the collapse.
The Investigation

Speculation about the cause of the accident began before emergency response workers had even finished rescuing survivors and removing bodies from the debris. One early theory was that the walkways collapsed due to harmonic stress introduced by people dancing on the catwalks, although witnesses dispute whether anyone on the walkways was dancing. Another theory speculated that the fabricator had failed to install washers along with the nuts at the walkway connections.

At the request of Kansas City's Mayor, Richard Berkley, the National Bureau of Standards (NBS) – now the National Institute of Standards and Technology – initiated an investigation of the Kansas City Hyatt Regency Catwalk collapse. The NBS determined that the load at the bottom nut on the rod running from the 4th floor walkway to the ceiling had deformed the C-channels in the box beam. The weld joint between the two facing C-channels then split and the washer, nut and rod slipped through the box beam, resulting in the collapse of the walkway (see Figure 3).

Because of the double rod design change initiated by Havens, the load at the nut on the 4th floor upper rod section was twice the load of the original single rod design. The investigation discovered that the original design could only support 60% of the load required by the building code. The shop drawing change to a two rod design doubled the load at the 4th floor connection, meaning that the as-constructed connection could only bear 30% of the mandated load.

Responsibility for Designing Connections

The steel-to-steel connection is what ultimately failed and resulted in the accident. Therefore, a historical perspective of design responsibility for steel-to-
Prior to World War II, the standard connections for steel columns and beams in buildings were rivets. Engineers had complete control over the design of all structural members in a building, including rivets.

As different bolted connections became prevalent in the post-war era, steel fabricators developed preferred methods of fabricating connections based upon their preferred fabrication and erection techniques. Fabricators found that connections designed by the engineer did not always match their preferences, which sometimes put the fabricator at a competitive disadvantage.

To save time and money, some fabricators began asking engineers for authority to design the connection details to suit the fabricator’s preferences. The engineers did not object to giving the fabricators this authority, provided that the connections were structurally sound. As this practice became established, some fabricators became proficient at designing simple connection details, usually with the aid of the AISC Manual of Steel Construction.

The specifications used on the Kansas City Hyatt Regency project did not specifically direct the fabricator to design steel-to-steel connections. It is ultimately the structural engineer’s choice as to who will design which connections. Over the years, the practice had become that the engineer would communicate whether he wished the fabricator to design a connection by the level of detail that he provided on the structural drawings. Where a fabricator sees a “complete” connection design on the drawings, then he is to copy it onto his shop drawings. Where a connection detail is omitted or is “incomplete” on the structural drawings, it is understood, by custom and practice, that the fabricator will design the connection and indicate such design on his shop drawings.

For “simple” connections, the fabricator can easily design the connection based on guidance from the AISC manual. For “special” connections which the engineer wishes the fabricator to design, the engineer must provide on the structural drawings all necessary information on loads, stress and eccentricities. Although special connections are typically designed by the structural engineer, he may elect to delegate this design work to the fabricator, provided that sufficient detail is provided on the structural drawings to allow the fabricator to design the connection.

In the case of the Hyatt atrium walkways, the original box beam connection detail shown in G.C.E.’s structural drawings was a “special” connection. It was not a “standard” connection that could be designed by reference to uniform load tables in the AISC manual because there is a concentrated load applied near the end of steel connections is in order.
the box beam, thus creating a structural eccentricity. Further, the connection was “special” because it was non-redundant. The failure of any of the box beam connections would have led to collapse of the entire walkway structure.

Given that the connection was “special” as it was depicted on the structural drawings, the engineer (being the only party with the knowledge of the information and the assumptions associated with the design of the “special” connection) had an obligation to either complete the design of the connection himself or direct the fabricator to use stiffeners or bearing plate(s) in the design of the connection.

Missouri Board of Architects, Professional Engineers and Land Surveyors Investigation

The Missouri Board of Architects, Professional Engineers, and Land Surveyors charged and ultimately convicted the engineer of record and the project engineer, both employed by G.C.E., with gross negligence, misconduct, and unprofessional conduct in the practice of engineering. Both engineers lost their P.E. licenses in Missouri.

At the Board’s hearing, the G.C.E. engineers claimed that they thought it was Havens’ responsibility to design and check the walkway connection details. They made this claim in spite the fact that the engineer of record stamped Havens’ shop drawings and erection drawings with his professional seal.

Ultimately, the Board determined that it was, in fact, the responsibility of the project engineer and the engineer of record to ensure that the connection details were structurally sound. The Board concluded that the failure to check the load capacity of a crucial hanger even once showed a complete disregard for the public welfare.

Factors That Contributed to the Collapse

In the end, the cause of the Hyatt walkway collapse was overstress of the connection detail designed by Havens, which could only withstand 30% of the load required by code. However, as is the case in many accidents, in the Hyatt project there was a chain of errors and missed opportunities to correct these errors. It was not just one simple mistake that ultimately led to the tragedy.
First, the original G.C.E. design was inadequate. In addition to the fact that the original design could only withstand 60% of the load required by code, constructability was not adequately considered in the design. The original single rod design was not practical from an erection standpoint, which was the catalyst for Havens to modify the design in the first place. And, the original G.C.E. design had no redundancy.

Additionally, the toe-to-toe channels in the box beam design resulted in a weak welded joint, which allowed the nut to pull through the box beam assembly. A back-to-back channel design using web stiffeners (Figure 4) or a toe-to-toe design with bearing plates (Figure 5) would have made the connection much more robust.

The building code process also failed the public. Neither the original design, nor the as-built connections met the building code requirements. However, due primarily to understaffing, the city’s building inspectors did not discover the design errors and the building was certified as safe for occupancy in 1980. At the time, Kansas City’s Codes Administration Division was not required to review design changes over the course of a project. And structural calculations were rarely reviewed by City Engineers. Finally, the building code should have required redundancy in the design of such a critical structural component.

G.C.E. had ample opportunity to discover the error when checking Havens’ shop drawings and erection drawings. The fact that G.C.E.’s engineer of record on the project stamped the drawings should have served as a reminder of his obligation to check the drawings. Further, the connection detailer, architect, fabricator, and technician all testified that they had contacted the project engineer regarding the structural integrity of the connection detail. Each time he assured them that the connection was structurally sound.
Finally, the collapse of the atrium roof during construction of the hotel should have been a wake-up call for the owner, the project engineer and the inspection team. The failure of the roof connections should have alerted the team to the need to check connection details in other components of the project. The owner did hire an independent consultant to investigate, but his scope of work was limited to investigation of the roof collapse. It is assumed that the consultant was not asked to investigate other structural connections because of the cost that would be involved.

Lessons Learned

Despite the injuries and loss of life, some good came out of the terrible tragedy at the Kansas City Hyatt. Changes were made in the Kansas City Codes Administration Division and in other city code inspection departments across the country. And the American Society of Civil Engineers (ASCE) announced a policy of holding structural engineers responsible for all aspects of structural safety in their building designs. Thus, there should be no confusion about the structural engineer’s obligation to review shop drawings and erection drawings.

As engineers, we can learn valuable lessons from the tragedy as well:

1. **Do Sweat the Details** – In a 40-story hotel project, the connection detail for a walkway may have seemed to be a minor detail. But, an error in this small detail resulted in the deaths of 114 people. Pay attention to the details! Check and recheck your work. Follow all applicable codes and regulations. You should always be diligent in your work, particularly in matters that affect the safety and health of the public.

2. **Don’t Emphasize Cost/Schedule to the Detriment of Safety** – Havens Construction changed to the ill-fated double rod connection detail because of cost and schedule considerations. The hotel limited the scope of the roof collapse investigation, presumably to save money. And, many believe that building inspectors missed the design error due to understaffing. Finally, we can only speculate, but it’s quite possible that the project engineer did not check his work because of competing work priorities. Many engineers find themselves under pressure to produce more, with less people, and a shorter schedule. Don’t fall into the trap of sacrificing quality and safety for cost or schedule.
3. **Consider Constructability in Your Design** – Constructability issues don’t normally cause a chain of events leading to the sort of death and destruction seen at the Kansas City Hyatt. But, a design that’s not practical to build will invariably result in cost and/or schedule impacts. During the design phase of the project, consider how difficult your product will be to fabricate and erect. Ask your fabricator about his preferred fabrication methods and make sure you consider the fabricator’s erection sequence and methods in your design.

4. **Change Management** – It’s not clear whether a formal change management process would have averted the tragedy at the Kansas City Hyatt. Nonetheless, it is imperative that you use a change management process on your projects. Changes initiated by anyone on the project should be documented in writing through a formal process. And any modifications to design details initiated by the fabricator should require written approval from the engineer of record.

5. **Design Responsibility** – ASCE guidelines issued as a result of the Kansas City Hyatt accident make it clear that the project structural engineer is responsible for all aspects of a building’s structural design. Regardless of the type of project, it is prudent to clearly delineate responsibilities between parties at the beginning of the project. This can be accomplished using a number of different tools, such as a Project Responsibility Matrix and clear and thorough job descriptions for each position on the project.

Fundamental Canon #1 of the NSPE Code of Ethics states:

“Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.”

The Kansas City Hyatt walkway collapse serves as a horrible reminder of the potential consequences when we are not diligent in our duties.
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Section 3
Florida Laws and Rules for Engineers
Florida Laws and Rules for Engineers

Renewal Cycle 2007-2009

By: Edward P. Brunet, Jr., P.E.
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Inquiries About This Course

You may send inquiries you have about this course to the course author. All inquiries will be answered in two (2) business days or less.

By Phone
Call 1-877-500-7145, then Press “4” to reach the Florida Laws & Rules hotline.

By Email
fl_laws_and_rules@pdhengineer.com

By Chat
Contact Live Support Chat Now

By Fax
Fax your inquiry to (281) 855-3779 using the fax form provided below.

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Comments: ________________________________

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Florida Laws and Rules for Engineers

Section 1 - Introduction
Overview

The course is divided into seven (7) sections.

Section 1 - Provides a brief overview of the sections of the Florida Administrative Code and the Florida Statutes that are applicable to professional engineers. The roles of the Board and the Florida Engineering Management Corporation (FEMC) are also discussed.

Section 2 - Reviews the rules that were adopted, amended or repealed during the immediately preceding biennium.

Section 3 - This section reviews any changes to Chapters 455 and 471 F.S. that were made by legislators during the preceding biennium.

Section 4 - Provides an overview of how the disciplinary process works.

Section 5 - Reviews the application of the provisions of Chapter 471 F.S. to individual disciplinary cases and unlicensed practice cases during the immediately preceding biennium.

Section 6 - Contains a list of resources used to develop this course.

Section 7 - Provides answers to the Practice Problems contained within the course document.

Florida Statutes

The Florida statutes are designed, more or less, to provide agencies with the authority to make rules to carry out statute. In many cases, the statute does not define specifically what can and cannot be done; that's the purpose of the Florida Administrative code. The statutes can only be added, amended, or deleted by the legislature.

There are two (2) chapters in the Florida Statutes that are of primary interest to Engineers.

Title XXXII, Chapter 455 – Business and Professional Regulation: General Provisions

Title XXXII applies to Regulation of Professions and Occupations. Chapter 455 includes general provisions that are applicable to all regulated professions, not just engineers. Some of the language in Chapter 455 is very prescriptive. Other language contains qualifiers. For example, Chapter 455.2178 states that if a Board requires continuing education, then the Board shall approve continuing education providers. In other words, the statute does not specifically require continuing education for all professions. But if a Board or department requires continuing education, then certain rules apply.

Some requirements in Chapter 455 that are applicable to engineers are:

- A Board may provide by rule that distance learning is acceptable for continuing education.
- A Board may issue a citation for certain offenses, and the Board is authorized to define the offenses for which a citation may be issued.
- The Board may provide a licensee with a notice of noncompliance for an initial offense of a minor violation. The Board is responsible for identifying those offenses for which a notice of noncompliance may be issued.
- The determination as to whether there is probable cause that a violation occurred shall be made by majority vote of a probable cause panel of the board.
- A formal hearing before an administrative law judge from the Division of Administrative Hearings shall be held if there are any disputed issues of material fact regarding a complaint.
- Allows the Board to assess an administrative fine not to exceed $5,000 for each offense.
Florida Laws and Rules for Engineers

Title XXXII, Chapter 471 – Engineering

Chapter 471, which is specific to engineering, is also a Florida Statute that can only be amended by the legislature. Some of the requirements in Chapter 471 are:

- Defines who must be licensed as an engineer, as well as persons who are exempt from licensure.
- Defines the number of members who must serve on the Florida Board of Professional Engineers and the required background for each member.
- Places a limit on fees for licensure, renewal, certificates of authorization, etc.
- Defines the minimum requirements for licensure and licensure by endorsement.
- Establishes the creation of the Florida Engineers Management Corporation and defines the purpose, financing and operation of the management corporation.

Florida Administrative Code

The Florida Administrative Code is the official compilation of the administrative rules and regulations of state agencies. Chapter 61G15 in the Florida Administrative Code covers the Board of Professional Engineers.

Unlike the Florida Statutes, amendments, additions or deletions to Chapter 61G15 do NOT require a vote by the legislature. The Board of Professional Engineers is empowered to revise Chapter 61G15. All proposed changes to the Florida Administrative Code are published in the Florida Administrative Weekly. The website is (https://www.flrules.org/).

Chapter 61G15 contains very specific rules regarding the practice of engineering in the state of Florida. Some examples are:

- Defines grounds for disciplinary proceedings, in addition to those specified in the Statutes.
- Defines penalty guidelines for specific infractions of the rules
- Defines very specific requirements for demonstration of substantial equivalency for applicants with degrees from non-EAC/ABET accredited programs.
- Prescribes exactly the form and size of seals that are acceptable.
- Prescribes procedures for sealing, signing and dating documents.
- Prescribes fees for licensure, renewal, etc. that are not in excess of the maximum fees allowed by the Florida Statutes
- Defines procedures for the adoption of another engineer’s work

The FEMC

The Florida Statutes establish that the Florida Board of Professional Engineers and other boards may contract with a nonprofit corporation to provide services for the regulation of professions. Below is the applicable language from Chapter 455.

Chapter 455.32

The purpose of this section is to create a model for contracting with nonprofit corporations to provide services for the regulation of Florida's professionals which will ensure a consistent, effective application of regulatory provisions and appropriate budgetary oversight to achieve the most efficient use of public funds. Nonprofit corporations may be established pursuant to this section to provide administrative, examination, licensing, investigative, and prosecutorial services to any board created within the department pursuant to chapter 20 in accordance with the provisions of this chapter and the applicable practice act.

Pursuant to Chapter 455.32, the Florida Engineers Management Corporation was established. The FEMC provides administrative,
investigative, and prosecutorial services to the Board.

The FEMC has a seven-member board of directors, five of whom are appointed by the board and must be registrants regulated by the board and two of whom are appointed by the secretary and must be laypersons not regulated by the board. The management corporation may hire staff as necessary to carry out its functions. Staff of the FEMC are not public employees.

It is important to note that the FEMC is empowered by the Board to investigate and prosecute disciplinary cases. However, the Board retains the sole authority to: a) determine probable cause in the pursuit of disciplinary action against a licensee, b) take final action on license applications or in disciplinary cases, and c) adopt administrative rules.

Practice Problem #1

List below the Chapters of the Florida Statutes and the Florida Administrative Code that are applicable to engineers.

Practice Problem #2

Describe below the respective roles of the legislature and the Board in enacting laws and rules for Florida Engineers.

Practice Problem #3

What functions does the FEMC provide for the Board?

What roles does the Board and the FEMC have, respectively, in the disciplinary process, including investigation, prosecution, probable cause determination, and issuing Final Orders.
Florida Laws and Rules for Engineers

Section 2 – Rules Adopted, Amended, or Repealed in the Preceding Biennium
**61G15-18.001: Definitions**

**Summary:** Added a new definition for "principal officers of the business organization" for purposes of Section 471.023, F.S.

**Notice:** Published in the 04/11/2008 issue of the Florida Administrative Weekly.

**Adopted:** Effective 06/05/2008

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**Final Rule (06/05/2008)**

**61G15-18.011: Definitions.**

As used in Chapter 471, F.S., and in these rules where the context will permit the following terms have the following meanings:

(1) “Responsible Charge” shall mean that degree of control an engineer is required to maintain over engineering decisions made personally or by others over which the engineer exercises supervisory direction and control authority. The engineer in responsible charge is the Engineer of Record as defined in subsection 61G15-30.002(1), F.A.C.

(a) The degree of control necessary for the Engineer of Record shall be such that the engineer:

1. Personally makes engineering decisions or reviews and approves proposed decisions prior to their implementation, including the consideration of alternatives, whenever engineering decisions which could affect the health, safety and welfare of the public are made. In making said engineering decisions, the engineer shall be physically present or, if not physically present, be available in a reasonable period of time, through the use of electronic communication devices, such as electronic mail, videoconferencing, teleconferencing, computer networking, or via facsimile transmission.

2. Judges the validity and applicability of recommendations prior to their incorporation into the work, including the qualifications of those making the recommendations.

(b) Engineering decisions which must be made by and are the responsibility of the Engineer of Record are those decisions concerning permanent or temporary work which could create a danger to the health, safety, and welfare of the public, such as, but not limited to, the following:

1. The selection of engineering alternatives to be investigated and the comparison of alternatives for engineering works.

2. The selection or development of design standards or methods, and materials to be used.

3. The selection or development of techniques or methods of testing to be used in evaluating materials or completed works, either new or existing.

4. The development and control of operating and maintenance procedures.

(c) As a test to evaluate whether an engineer is the Engineer of Record, the following shall be considered:

1. The engineer shall be capable of answering questions relevant to the engineering decisions made during the engineer’s work on the project, in sufficient detail as to leave little doubt as to the engineer’s proficiency for the work performed and involvement in said work. It is not necessary to defend decisions as in an adversary situation, but only to demonstrate that the engineer in responsible charge made them and possessed sufficient knowledge of the project to make them. Examples of questions to be answered by the engineer could relate to criteria for design, applicable codes and standards, methods of analysis, selection of materials and systems, economics of alternate solutions, and environmental considerations. The individuals should be able to clearly define the span and degree of control and how it was exercised and to demonstrate that the engineer was answerable within said span and degree of control necessary for the engineering work done.

2. The engineer shall be completely in charge of, and satisfied with, the engineering aspects of the project.

3. The engineer shall have the ability to review design work at any time during the development of the project and shall be available to exercise judgment in reviewing these documents.
4. The engineer shall have personal knowledge of the technical abilities of the technical personnel doing the work and be satisfied that these capabilities are sufficient for the performance of the work.

(d) The term “responsible charge” relates to engineering decisions within the purview of the Professional Engineers Act and does not refer to management control in a hierarchy of professional engineers except as each of the individuals in the hierarchy exercises independent engineering judgement and thus responsible charge. It does not refer to administrative and personnel management functions. While an engineer may also have such duties in this position, it should not enhance or decrease one’s status of being in responsible charge of the work. The phrase does not refer to the concept of financial liability.

(2) “Engineering Design” shall mean that the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. Central to the process are the essential and complementary roles of synthesis and analysis. This definition is intended to be interpreted in its broadest sense. In particular the words “system, component, or process” and “convert resources optimally” operate to indicate that sociological, economic, aesthetic, legal, ethical, etc., considerations can be included.

(3) The term “evaluation of engineering works and systems” as used in the definition of the practice of engineering set forth in Chapter 471.005(4)(a), F.S., includes but is not limited to services provided by testing laboratories involving the following:

(a) The planning and implementation of any investigation or testing program for the purpose of developing design criteria either by an engineering testing laboratory or other professional engineers.

(b) The planning or implementation of any investigation, inspection or testing program for the purpose of determining the causes of failures.

(c) The preparation of any report documenting soils or other construction materials test data.

(d) The preparation of any report offering any engineering evaluation, advice or test results, whenever such reports go beyond the tabulation of test data. Reports which document soils or other construction materials test data will be considered as engineering reports.

(e) Services performed by any entity or provided by a testing laboratory for any entity subject to regulation by a state or federal regulatory agency which enforces standards as to testing shall be exempt from this rule except where the services otherwise would require the participation of a professional engineer.

(4) “Certification” shall mean a statement signed and/or sealed by a professional engineer representing that the engineering services addressed therein, as defined in Section 471.005(6), F.S., have been performed by the professional engineer, and based upon the professional engineer’s knowledge, information and belief, and in accordance with commonly accepted procedures consistent with applicable standards of practice, and is not a guaranty or warranty, either expressed or implied.

(5) “FEMC” shall mean the Florida Engineers Management Corporation, created in Section 471.038(3), F.S.

(6) The term “principal officer(s) of the business organization” as used in Section 471.023(1), F.S., means the (a) President, Vice President, Secretary or Treasurer of the Corporation, or Limited Liability Company (LLC); or (b) any other officer who has management responsibilities in the corporation or LLC, as documented by the corporate charter or bylaws so long as such documentation provides that such officer is empowered to bind the corporation or LLC in all of its activities which fall within the definition of the practice of engineering as that term is defined in Section 471.005(7), F.S.

Specific Authority 471.008, 471.013(1)(a)1., 2. FS. Law Implemented 471.003(2)(f), 471.005(7), 471.005(6), 471.013(1)(a)1., 2., 471.023(1), 471.025(3), 471.033(1)(j) FS. History—New 6-23-80, Amended 12-19-82, 11-22-83, Formerly 21H-18.11, Amended 1-16-91, 4-4-93, Formerly 21H-18.011, Amended 12-22-99, 4-19-01, 10-16-02, 9-15-04, 6-5-08.
Summary: Several additions, deletions and amendments to the disciplinary guidelines were made.

Notice: Published in the 9/29/2006 issue of the Florida Administrative Weekly.

Adopted: Effective 11/21/2006

61G15-19.004: Disciplinary Guidelines; Range of Penalties; Aggravating and Mitigating Circumstances

(1) The Board sets forth below a range of disciplinary guidelines from which disciplinary penalties will be imposed upon practitioners (including holders of certificate of authorization) guilty of violating Chapter 471, F.S. The purpose of the disciplinary guidelines is to give notice to licensees of the range of penalties which will normally be imposed upon violations of particular provisions of Chapter 471, F.S. The disciplinary guidelines are based upon a single count violation of each provision listed. Multiple counts of violations of the same provision of Chapter 471, F.S., or the rules promulgated thereto, or other unrelated violations contained in the same administrative complaint will be grounds for enhancement of penalties. All penalties at the upper range of the sanctions set forth in the guidelines, i.e., suspension, revocation, etc., include lesser penalties, i.e., fine, probation or reprimand which may be included in the final penalty at the Board’s discretion. All impositions of probation as a penalty shall include successful completion of the Engineering Law and Rules Study Guide, completion of a Board-approved course in Engineering Professionalism and Ethics, and an appearance before the Board at the option of the Board at the end of the probationary period. Other terms may be imposed by the Board at its discretion.

(2) The following disciplinary guidelines shall be followed by the Board in imposing disciplinary penalties upon licensees for violation of the below mentioned statutes and rules:

<table>
<thead>
<tr>
<th>VIOLATION</th>
<th>PENALTY RANGE</th>
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<tbody>
<tr>
<td>(a) Violating any provision of Section 455.227(1), 471.025 or 471.031, F.S., or any other provision of Chapter 471, F.S., or rule of the Board or Department (Sections 471.033(1)(a) and 455.227(1)(b), (q), F.S)</td>
<td>Reprimand and $1,000 fine</td>
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<td></td>
<td>Maximum</td>
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<tr>
<td></td>
<td>One (1) year suspension, two (2) years probation and $5,000 fine</td>
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<tr>
<td>1. Failure to sign, seal or date documents (Section 471.025(1), F.S.)</td>
<td>Reprimand</td>
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<td>Maximum</td>
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<td>Reprimand and one (1) year probation</td>
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<td>2. Sealing any document after license has expired or been revoked or suspended, or failure to surrender seal if the license has been revoked or suspended (Section 471.025(2), F.S.)</td>
<td>Suspended license: Revocation and $1,000 fine</td>
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<td>Maximum</td>
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<td>Revoked license: Referral to State’s Attorney’s office</td>
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<td>VIOLATION</td>
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<td>3. Signing or sealing any document that depicts work the licensee is not licensed to perform or which is beyond his or her profession or specialty therein or practicing or offering to practice beyond the scope permitted by law or accepting and performing responsibilities the licensee is not competent to perform (Sections 471.025(3), 455.227(1)(o), F.S., paragraphs 61G15-19.001(6)(c), (d), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
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<tr>
<td>5. Failure to complete continuing education (Section 471.017(3), F.S. and Rule 61G15-22.001, F.A.C.)</td>
<td>Suspend until licensee demonstrates compliance</td>
</tr>
<tr>
<td>6. Practicing engineering without a license or using a name or title tending to indicate that such person holds an active license as an engineer (Sections 471.031(1)(a), (b), F.S.)</td>
<td>$1,000 fine per count</td>
</tr>
<tr>
<td>7. Presenting as his or her own the license of another (Section 471.031(1)(c), F.S.)</td>
<td>$1,000 fine per count</td>
</tr>
<tr>
<td>8. Giving false or forged evidence to the Board or concealing information relative to violations of this chapter (Sections 471.031(1)(d), (g), F.S.)</td>
<td>$1,000 fine per count</td>
</tr>
<tr>
<td>9. Employing unlicensed persons to practice engineering or aiding, assisting, procuring, employing unlicensed practice or practice contrary to Chapter 455 or 471, F.S.</td>
<td>$1,000 fine per count and reprimand</td>
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<tr>
<td>VIOLATION</td>
<td>PENALTY RANGE</td>
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<td>(Sections 471.031(1)(f) and 455.227(1)(j), F.S.)</td>
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<td>10. Having been found liable for knowingly filing a false complaint against another licensee (Section 455.227(1)(g), F.S.)</td>
<td>$1,000 fine per count and reprimand</td>
</tr>
<tr>
<td>11. Failing to report a person in violation of Chapter 455, Chapter 471, F.S., or the rules of the Board or the Department (Section 455.227(1)(i), F.S.)</td>
<td>Reprimand</td>
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<tr>
<td>12. Failing to perform any statutory or legal obligation (Section 455.227(1)(k), F.S.)</td>
<td>Reprimand</td>
</tr>
<tr>
<td>13. Exercising influence on a client for financial gain (Section 455.227(1)(n), F.S.)</td>
<td>Reprimand</td>
</tr>
<tr>
<td>14. Improper delegation of professional responsibilities (Section 455.227(1)(p), F.S.)</td>
<td>$1,000 fine per count and probation for one (1) year</td>
</tr>
<tr>
<td>15. Improperly interfering with an investigation or inspection or disciplinary proceeding (Section 455.227(1)(r), F.S.)</td>
<td>$1,000 fine per count and probation for one (1) year</td>
</tr>
<tr>
<td>(b) Attempting to procure a license by bribery, fraudulent misrepresentation, or error of the Board or Department (Sections 471.033(1)(b) and 455.227(1)(h), F.S.)</td>
<td>Revocation and $1,000 fine if licensed; if not licensed, denial of license and referral to State Attorney</td>
</tr>
<tr>
<td>(c) Having a license to practice engineering acted against or denied by another jurisdiction (Sections 471.033(1)(c) and 455.227(1)(f), F.S.)</td>
<td>Same penalty as imposed in other jurisdiction or as close as possible to penalties set forth in Florida Statutes</td>
</tr>
<tr>
<td>(d)1. Being convicted or found guilty of, Misdemeanor: reprimand and</td>
<td>Reprimand, $5,000 fine, one (1)</td>
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<td>VIOLATION</td>
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| or entering a plea of nolo contendere to a crime which relates to the practice or ability to practice (Sections 471.033(1)(d) and 455.227(1)(c), F.S.) | MINIMUM: one (1) year probation  
MAXIMUM: Felony: Revocation and $1,000 fine |
| 2. Conviction of crime related to building code inspection or plans examination (paragraph 61G15-19.001(7)(a), F.A.C.) | MINIMUM: Misdemeanor: reprimand and one (1) year probation  
MAXIMUM: Felony: Revocation and $5,000 fine |
| (e) Knowingly making or filing a false report or record, failing to file a report or record required by law, impeding or obstructing such filing (Sections 471.033(1)(e), 455.227(1)(l), F.S. and paragraph 61G15-19.001(7)(c), F.A.C.) | MINIMUM: One (1) year suspension, two (2) years probation, $1,000 fine  
MAXIMUM: Revocation and $5,000 fine |
| (f) Fraudulent, false, deceptive or misleading advertising (Sections 471.033(1)(f), F.S. and subsection 61G15-19.001(2), F.A.C.) | Reprimand  
MAXIMUM: Reprimand, $5,000 fine, one (1) year probation and $5,000 fine |
| (g) Fraud, deceit, negligence, incompetence or misconduct (Sections 471.033(1)(g) and 455.227(1)(a), (m), F.S.) | Reprimand, two (2) years probation and $1,000 fine  
MAXIMUM: $5,000 fine and revocation |
| 1. Fraud or deceit                                                       | Reprimand, two (2) years probation and $1,000 fine  
MAXIMUM: $5,000 fine and revocation |
| 2.a. Negligence (subsection 61G15-19.001(4), F.A.C.)                    | Reprimand, two (2) years probation and $1,000 fine  
MAXIMUM: Reprimand, $5,000 fine, five (5) year suspension and ten (10) years probation |
| b. As a special inspector                                                | Reprimand, two (2) years probation and $1,000 fine  
MAXIMUM: Reprimand, $5,000 fine, five (5) year suspension and ten (10) years probation or revocation |
<p>| 3. Incompetence (subsection 61G15-19.001(5), F.A.C.)                    | Suspension until ability to practice proved followed by |</p>
<table>
<thead>
<tr>
<th>VIOLATION</th>
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<td></td>
<td>MINIMUM</td>
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<td></td>
<td>probation</td>
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<td>4. Misconduct (subsection 61G15-19.001(6), F.A.C.)</td>
<td>$1,000 fine per count and reprimand</td>
</tr>
<tr>
<td>a. Expressing an opinion publicly on an engineering subject without being informed as to the facts and being competent to form a sound opinion (paragraph 61G15-19.001(6)(a), F.A.C.)</td>
<td>Reprimand and $1,000 fine per count</td>
</tr>
<tr>
<td>b. Being untruthful, deceptive or misleading in any professional report, statement or testimony or omitting relevant and pertinent information from such report, statement or testimony when the result or such omission would or reasonably could lead to a fallacious conclusion (paragraph 61G15-19.001(6)(b), F.A.C.)</td>
<td>Reprimand and $1,000 fine per count</td>
</tr>
<tr>
<td>c. Offering directly or indirectly any bribe or commission or tendering any gift to obtain selection or preferment for engineering employment other than the payment of the usual commission for securing salaried positions through licensed employment agencies (paragraph 61G15-19.001(6)(e), F.A.C.)</td>
<td>$5,000 fine per count and suspension for five (5) years</td>
</tr>
<tr>
<td>d. Soliciting or accepting gratuities without client knowledge (paragraphs 61G15-19.001(6)(g), (h), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
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<tr>
<td>e. Failure to preserve client’s confidence (paragraph 61G15-19.001(6)(r), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
</tr>
<tr>
<td>f. Professional judgment overruled by unqualified person (paragraph 61G15-19.001(6)(i), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
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<td>g. Use of name/firm in fraudulent venture (paragraph 61G15-19.001(6)(k), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
</tr>
<tr>
<td>h. Undisclosed conflict of interest (paragraphs 61G15-19.001(6)(f), (p), F.A.C.)</td>
<td>Reprimand, $1,000 fine and two (2) years probation</td>
</tr>
<tr>
<td>(h) Violating any provision of Chapter 455, F.S. (Sections 471.033(1)(h) and 455.227(1)(q), F.S.)</td>
<td>Reprimand and $1,000 fine per count</td>
</tr>
<tr>
<td>(i) Practicing on a revoked, suspended, inactive or delinquent license (Sections 471.033(1)(i) and 471.031(1)(e), F.S.)</td>
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<tr>
<td>1. Delinquent license</td>
<td>Reprimand</td>
</tr>
<tr>
<td>2. Inactive license</td>
<td>Fine based on length of time in practice while inactive; $100/month or $1,000 maximum, renewal of license or cease practice</td>
</tr>
<tr>
<td>3. Suspended license</td>
<td>Revocation and $1,000 fine</td>
</tr>
<tr>
<td>4. Revoked license</td>
<td>Referral to State Attorney</td>
</tr>
<tr>
<td>(j) Affixing or permitting to be affixed his or her seal, name, or digital signature to any documents that were not prepared by him or her or under his or her responsible supervision, direction or control (Section 471.033(1)(j), F.S. and paragraphs 61G15-19.001(6)(j), (q), F.A.C.)</td>
<td>Reprimand, one (1) year probation and $1,000 fine</td>
</tr>
<tr>
<td>(k) Violating any order of the board or department (Sections 471.033(1)(k), 455.227(1)(q),</td>
<td>Suspension and $1,000 fine</td>
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</tbody>
</table>
### VIOLATION

<table>
<thead>
<tr>
<th>F.S. and paragraph 61G15-19.001(6)(o), F.A.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(l) Aiding, assisting, procuring, employing unlicensed practice or practice contrary to Chapter 455 or 471, F.S. (Section 455.227(1)(j), F.S.)</td>
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</table>

### PENALTY RANGE

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<tr>
<th>MINIMUM</th>
<th>MAXIMUM</th>
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</thead>
<tbody>
<tr>
<td>Reprimand and $1,000 fine per count</td>
<td>$5,000 fine per count and revocation</td>
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</tbody>
</table>

(3) The board shall be entitled to deviate from the above-mentioned guidelines upon a showing of aggravating or mitigating circumstances by clear and convincing evidence presented to the board prior to the imposition of a final penalty. The fact that a Hearing Officer of the Division of Administrative Hearings may or may not have been aware of the below mentioned aggravating or mitigating circumstances prior to a recommendation of penalty in a Recommended Order shall not obviate the duty of the board to consider aggravating and mitigating circumstances brought to its attention prior to the issuance of a Final Order.

(a) Aggravating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the enhancement of a penalty beyond the maximum level of discipline in the guidelines shall include but not be limited to the following:

1. History of previous violations of the practice act and the rules promulgated thereto.

2. In the case of negligence; of the magnitude and scope of the project and the damage inflicted upon the general public by the licensee’s misfeasance.

3. Evidence of violation of professional practice acts in other jurisdictions wherein the licensee has been disciplined by the appropriate regulatory authority.

4. Violation of the provision of the practice act wherein a letter of guidance as provided in Section 455.225(3), F.S., has previously been issued to the licensee.

(b) Mitigating circumstances; circumstances which may justify deviating from the above set forth disciplinary guidelines and cause the lessening of a penalty beyond the minimum level of discipline in the guidelines shall include but not be limited to the following:

1. In cases of negligence, the minor nature of the project in question and lack of danger to the public health, safety and welfare resulting from the licensee’s misfeasance.

2. Lack of previous disciplinary history in this or any other jurisdiction wherein the licensee practices his profession.

3. Restitution of any damages suffered by the licensee’s client.

4. The licensee’s professional standing among his peers including continuing education.

5. Steps taken by the licensee or his firm to insure the non-occurrence of similar violations in the future.

<table>
<thead>
<tr>
<th>Practice Problem #4</th>
<th>Practice Problem #5</th>
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<tbody>
<tr>
<td>Describe below, in general terms, the range of penalties prescribed in the Disciplinary Guidelines.</td>
<td>Describe below, in general terms, the degree of control that must be exercised by the Engineer of Record.</td>
</tr>
</tbody>
</table>

What types of questions should an engineer in responsible charge be able to answer regarding his proficiency, decision-making and degree of involvement on a particular project?
As used hereinafter in this chapter the following words or phrases shall be defined as follows:

1. “Year” shall mean 12 months of full-time employment or a full-time academic year of graduate or undergraduate college education.

2. “Board approved engineering programs” shall mean:
   a. Engineering programs accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (EAC/ABET), or
   b. In the case of an applicant who did not graduate from an approved program as set forth in paragraph (2)(a) above, and who holds a baccalaureate degree from an engineering program that is not accredited by EAC/ABET, provided the applicant meets the educational requirements set forth in subsection 61G15-20.007(1), F.A.C., or
   c. Programs which have been approved by the Board of Professional Engineers under the provisions of Section 455.11(3), F.S.

Specific Authority 471.013(1)(a) FS. Law Implemented 471.013(1)(a) FS. History–New 1-8-80, Amended 4-15-80, 7-7-83, 9-13-83, Formerly 21H-20.01, Amended 4-20-86, 8-3-86, 5-20-92, 2-2-93, Formerly 21H-20.001, Amended 11-19-03, 3-13-05, 4-9-07, 1-31-08.
61G15-20.006: Educational Requirements

Summary: This change was made to comply with the Mandate of the Court in Gaudet v. Board of Professional Engineers and promulgate more detailed rules regarding board approval of non-ECA/ABET approved engineering programs.

Notice: Published in the 07/28/2006 issue of the Florida Administrative Weekly. Various changes were made to the original language and published in the Florida Administrative Weekly prior to final adoption of the Rule. Changes were published on 09/29/2006, 12/01/2006, 01/11/2008, 02/22/2008.

Adopted: Effective 04/10/2008

Final Rule (04/10/2008)


(1) The evaluation of curricula and standards of accreditation for approval of degree programs required by Section 471.013, F.S., shall be made by the Education Advisory Committee and shall be based upon an overview of engineering programs within the United States accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc., (EAC/ABET) and found in the applicable Annual Report of EAC/ABET.

(2) A non-EAC/ABET accredited engineering degree program (hereinafter “engineering program”) which seeks approval pursuant to Section 471.013(1)(a), F.S., shall submit the following to the Board:

(a) A completed application form “Request for Evaluation” [FBPE/007 (11-07)] and “Self-Study Report” [FBPE/008 (1-08)] hereby incorporated by reference (which may be obtained from the Board by writing to: Executive Director, Florida Board of Professional Engineers, 2507 Callaway Road, Suite 200, Tallahassee, Florida 32304);

(b) A current catalog and student and faculty handbook.

(3) The Board’s survey and evaluation of an engineering program shall consist of two elements:

(a) A review of the documents submitted by the applicant. The purpose of the review is initially to determine if the application is complete. The applicant will be notified if the application is not complete. If the application is complete, the Board will begin the survey and evaluation of the engineering program and will provide the documents to any outside consultants which the Board may retain to survey and evaluate the engineering program.

(b) A visit to the engineering school, including visits to facilities at locations other than the main campus, at the expense of the applying engineering program. This site visit will encompass all elements of the standards for approval set forth in this rule. A site visit is an essential requirement in the review of an engineering program seeking certification, without which no approval may be granted by the Board.

(4) The Meaning of Approval.

(a) Purpose.

1. Approval of an engineering program is the responsibility of the Board and is based on standards established by the Board. The same standards as are applied in the accreditation of engineering programs by EAC/ABET will be applied for approval of an engineering program.

2. In practical terms a graduate of an engineering program that has been certified by the State of
Florida will be eligible for the Fundamentals and Principles and Practice examinations, or for licensure by endorsement.

3. Application for approval is entirely voluntary on the part of the school.

(b) Standards.

1. To be approved, engineering programs must meet the standards set forth by the Board in this rule as judged by the Board. These standards are sometimes stated in a fashion that is not susceptible to quantification or to precise definition because the nature of the evaluation is qualitative in character and can be accomplished only by the exercise of professional judgment by qualified persons.

2. In these standards, the words “must” and “should” have been chosen with care. Use of the word “must” indicates that Florida considers meeting the standard to be absolutely necessary if the program is to be certified. Use of the word “should” indicates that Florida considers an attribute to be highly desirable and makes a judgment as to whether or not its absence may compromise substantial compliance with all of the requirements for approval.

(5) Objectives.

(a) An essential objective of a program in engineering education leading to a BSE degree must be to meet the standards herein described for approval that its graduates will be prepared to qualify for licensure, to provide competent engineering services and to have the educational background necessary for lifelong learning. An engineering program may establish additional objectives consistent with its available resources. Objectives must be defined in writing and made known to faculty and students. While recognizing the existence and appropriateness of diverse institutional missions and educational objectives, the Board subscribes to the proposition that local circumstances do not justify approval of a program that fails to meet the standards as set forth in this rule.

(b) Approval is granted on the basis of evidence of an appropriate balance between the size of the enrollment in each class and the total resources of the program, including the faculty, physical facilities, curricular time and methods of instruction, and the budget. If there is to be substantial change in any of the above functions, the Board must be notified in writing so that reevaluation may be instituted.

(6) Governance.

(a) Preferably an engineering school should be a component of a university that has other graduate and professional degree granting programs. The environment of a university fosters intellectual challenge, the spirit of inquiry, the seeking of new knowledge and the habit of lifelong learning.

(b) The engineering school must be accredited by an accrediting organization recognized by the U.S. Department of Education.

(7) Administration.

(a) General.

1. Administrative officers and members of an engineering school faculty must be appointed by, or on the authority of, the governing body of the engineering school.

2. If the engineering school is part of a university, the dean must have ready access to the university chief executive officer and to such other university officials as may be necessary to fulfill the dean's responsibilities. If the engineering school is not part of a university, the dean must have ready access to the chief officer of the governing body.

3. The dean must be qualified by education and experience to provide leadership in engineering education, in scholarly activity and research, and in the practice of professional engineering. The dean should have the assistance of such professional associates and staff as are necessary for administration of admissions, student affairs, academic affairs, business affairs, physical facilities and other activities normally associated with the office of the dean.

4. The manner in which the engineering school is organized, including the responsibilities and privileges of administrative officers, faculty, students and committees must be formally set forth in writing. It is through committee structure and function that faculty and at times students and others become involved in decisions concerning admissions, promotions, curriculum, library, research, etc. The number and composition of committees may vary among engineering programs.

5. A budget, showing available revenue sources and expenditures must be prepared for the
To facilitate effective planning, each engineering program should know in advance a reasonable estimate of its available operating resources.

(b) Geographically Separated Campuses.

1. If components of the program are conducted at sites geographically separated from the main campus of the engineering school, the administration of the engineering school must be fully responsible for the conduct, and maintenance of the quality of the educational experiences offered at these sites and for identification of the faculty at all sites. In order to ensure that all educational components of the school's program are equivalent in quality, the principal academic officer of each geographically separated site must be administratively responsible to the chief academic officer of the engineering school conducting the certified program. Similarly, the faculty in each discipline, in all sites, must be functionally integrated by administrative mechanisms that ensure comparable quality of the geographically separated segments of the program.

2. A large number of program sites or a significant distance between sites may require extra academic and administrative controls in order to maintain the quality of the entire program.

(c) Design and Management.

1. The program’s faculty must be responsible for the design, implementation, and evaluation of the educational program. A faculty committee should undertake this responsibility with full support of the chief academic officer and staff. The curriculum of the program leading to the professional engineering degree must be designed to provide a general professional education, recognizing that, this alone, is insufficient to prepare a graduate for independent, unsupervised practice throughout a professional lifetime.

2. The committee responsible for curriculum should give careful attention to the impact on students of the amount of work required. The committee should monitor the content provided in each discipline in order that objectives for education of an engineer are achieved without attempting to present the complete, detailed, systematic body of knowledge in that discipline. The objectives, content, and methods of teaching and learning utilized for each segment of the curriculum, as well as for the entire curriculum, should be subjected to periodic evaluation. Undue repetition and serious omissions and deficiencies in the curriculum identified by these evaluations should be corrected. Review and necessary revision of the curriculum is an ongoing faculty responsibility.

(d) Content.

1. The engineering faculty is responsible for devising a curriculum that permits the student to learn the fundamental principles of engineering, to acquire skills of critical judgment based on evidence and experience, and to develop an ability to use principles and skills wisely in solving engineering problems. In addition, the curriculum must be designed so that students acquire an understanding of the scientific concepts underlying engineering. In designing the curriculum, the faculty must introduce current advances in the basic engineering sciences.

2. The curriculum cannot be all-encompassing. However, it must include the sciences basic to engineering and ethical, behavioral, and socioeconomic subjects pertinent to engineering. There should be presentation of material on engineering ethics and human values. The faculty should foster in students the ability to learn through self-directed, independent study throughout their professional lives.

3. The required subjects which must be offered are probability and statistics, differential calculus, integral calculus, and differential equations; general chemistry and calculus-based general physics, with at least a two semester (or equivalent) sequence of study in either area. Additional courses may include linear algebra, numerical analysis, and advanced calculus, life sciences (biology), earth sciences (geology), and advanced chemistry or physics.

4. The curriculum should provide grounding in the body of knowledge represented in the disciplines that support the fundamentals of engineering practice, such as, mechanics, thermodynamics, electrical and electronic circuits, and materials science. Courses in engineering design stress the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation. In order to promote breadth, at least one engineering course outside the major disciplinary area is required.
5. The faculty committee responsible for curriculum should develop, and the chief academic officer should enforce, the same rigorous standards for the content of each year of the program leading to the BSE. The final year should complement and supplement the curriculum of the individual student so that each student will acquire appropriate competence in general engineering care regardless of subsequent career specialty.

6. The curriculum should include elective courses designed to supplement the required courses and to provide opportunities for students to pursue individual scholarly interests. Faculty advisors must be available to guide students in the choice of elective courses. If students are permitted to take electives at other institutions, there should be a system centralized in the dean’s office to screen the student’s proposed extramural program prior to approval and to ensure the return of a performance appraisal by the host program. Another system, devised and implemented by the dean, should verify the credentials of students from other schools wishing to take courses at the school, approve assignments, maintain a complete roster of visiting students, and provide evaluations to the parent schools.

(e) Evaluation of Student Performance.

1. The faculty must establish principles and methods for the evaluation of student performance and make decisions regarding promotion and graduation. The varied measures utilized should determine whether or not students have attained the school’s standards of performance.

2. The faculty of each discipline should set the standards for performance by students in the study of that discipline. The faculty should review the frequency of examinations and their scheduling, particularly when the students are enrolled in several subjects simultaneously. Schools should develop a system of evaluation that fosters self-initiated learning by students rather than frequent tests which condition students to memorize details for short-term retention only. Examinations should measure cognitive learning, mastery of basic engineering skills, and the ability to use data in realistic problem solving. If geographically separated campuses are operated, a single standard for promotion and graduation of students should be applied.

3. The engineering school must publicize to all faculty members and students its standards and procedures for the evaluation, advancement, and graduation of its students and for disciplinary action. The school should develop and publish a fair and relatively formal process for the faculty or administration to follow when taking any action that adversely affects the status of a student.

4. The institutions must maintain adequate records. These records should include summaries of admission credentials, attendance, measurement of the performance and promotion of the student, and the degree to which requirements of the curriculum have been met. Evaluation of each student in each course should be part of the record.

5. Academic Counseling. The chief academic officer and the directors of all courses must design and implement a system of evaluation of the work of each student during progression through each course. Each student should be evaluated early enough during a unit of study to allow time for remediation. Course directors and faculty assigned to advise students should consider this duty a primary responsibility. All course directors or departmental heads, or their designates, should serve as expert consultants to the chief academic officer for facilitation of performance of both students and faculty.

(8) Resources for the Educational Program.

(a) Finances. The cost of conducting a certified educational program leading to the BSE must be supported by sufficient financial resources. Dependence upon tuition must not cause schools to seek enrollment of more students than their total resources can accommodate and provide with a sound education experience.

(b) Faculty.

1. Members of the faculty must have the capability and continued commitment to be effective teachers. Effective teaching requires knowledge of the discipline, and an understanding of pedagogy, including construction of a curriculum consistent with learning objectives, subject to internal and external formal evaluation. The administration and the faculty should have knowledge of methods for measurement of student performance in accordance
with stated educational objectives and national norms.

2. Persons appointed to faculty positions must have demonstrated achievements within their disciplines commensurate with their faculty rank. It is expected that faculty members will have a commitment to continuing scholarly productivity, thereby contributing to the educational environment of the engineering school.

3. In each of the major disciplines basic to engineering sciences, a sufficient number of faculty members must be appointed who possess, in addition to a comprehensive knowledge of their major disciplines, expertise in one or more subdivisions or specialties within each of these disciplines.

4. In addition, engineers practicing in the community can make a significant contribution to the educational program of the engineering school, subject to individual expertise, commitment to engineering education, and availability. Practicing engineers appointed to the faculty, either on a part-time basis or as volunteers, should be effective teachers, serve as role models for students, and provide insight into contemporary engineering methods.

5. There must be clear written policies for the appointment, renewal of appointment, promotion, retention and dismissal of members of the faculty. The appointment process must involve the faculty, the appropriate departmental heads and the dean. Each appointee should receive a clear definition of the terms of appointment, responsibilities, line of communication, privileges and benefits.

6. The education of engineering students requires an academic environment that provides close interaction among the faculty members so that those skilled in teaching and research in the basic sciences can maintain awareness of the relevance of their disciplines to engineering problems.

7. The dean and a committee of the faculty must determine engineering school policies. This committee typically consists of the heads of major departments, but may be organized in any manner that brings reasonable and appropriate faculty influence into the governance and policymaking processes of the school. The full faculty should meet often enough to provide an opportunity for all to discuss, establish, or otherwise become acquainted with engineering school policies and practices.

(c) Library.

1. The engineering school library should be a major component of the school’s program of teaching and learning. Attitudes of lifelong learning can only be instilled by instruction in the production, storage and retrieval of new knowledge. Use and importance of the library can be imparted to students by example of faculty.

2. The engineering students and faculty must have ready access to a well-maintained and catalogued library, sufficient in size and breadth to support the educational programs offered by the institution. The library should receive the leading national and international engineering periodicals, the current numbers of which should be readily accessible. The library and any other learning resources should be equipped to allow students to learn new methods of retrieving and managing information, as well as to use self-instructional materials. A professional library staff should supervise the library and provide instruction in its use.

3. If the library serving the engineering school is part of a university library system, the professional library staff must be responsive to the needs of the engineering school, the faculty, resident staff and students who may require extended access to a journal and reference book collection, some of which may be virtual. The librarian should be familiar with the methods for maintaining relationships between the library and national library systems and resources, and with the current technology available to provide services in non-print materials. If the faculty and students served by the library are dispersed, the utilization of departmental and branch libraries should be facilitated by the librarian and by the administration and faculty of the school.

(9) Site Visit.

(a) The site visit team shall consist of the Educational Advisory Committee and individual(s) designated by the Board who are or have been engineering educators and practitioners experienced in engineering program evaluation. The applicant must assist the Board in making all necessary arrangements for the site visit, including the
opportunity to meet trustees, owners or their representatives, administrators, faculty, students, and any others connected with the program.

(b) Following the site visit, the Educational Advisory Committee will report its findings to the Board.

(10) Board Approval.

(a) Upon receipt of a report from the Educational Advisory Committee, the Board will notify the applicant of its intent to grant or deny approval. Approval must be denied if deficiencies found are of such magnitude as to prevent the students in the school from receiving an educational base suitable for the practice of engineering.

(b) If the Board gives notice of its intent to deny the application for approval, the notice shall include a specific list of deficiencies and what the Board will require for compliance. The Board shall permit the applicant, on request, to demonstrate by satisfactory evidence, within 90 days, that it has remedied the deficiencies specified by the Board.

(c) If the Board gives notice of its intent to approve the application, it shall specify which type it intends to grant: provisional or full approval.

(d) Provisional approval may be granted where deficiencies exist but are not of such magnitude to warrant denial entirely. The Board shall determine the period of provisional approval, not to exceed three years, based on the nature of the deficiencies found, and an estimate of the reasonable period of time which may be necessary to remedy the deficiencies. Failure to remedy the deficiencies within the time specified by the Board may be grounds for denial of approval. The Board may, however, extend the period within which deficiencies may be remedied, if there is good cause to do so. A site visit may be required by the Board if it deems it necessary to determine whether the deficiencies have been adequately remedied and whether any other conditions may have changed during the period of provisional approval.

(e) Full approval will be granted to an engineering school which is in substantial compliance with all of the standards set forth in this rule. The school shall submit to the Board evidence of continued compliance annually.

(f) Periodic surveys and evaluations of all approved schools shall be made at least every four years.

(g) Renewal applications will be evaluated on the basis of standards existing at the time renewal is acted upon by the Board. A site visit may be required as an element of the evaluation.

Specific Authority 471.013(1)(a)3. FS. Law Implemented 471.013(1)(a)3., 471.005(6) FS. History—New 8-18-87, Formerly 21H-20.006, Amended 12-26-94, 4-10-08.
61G15-20.007: Demonstration of Substantial Equivalency

Summary: Deleted one of the approved education evaluation services because the evaluations do not conform to Board standards. Foreign Credentials Service of America, 1910 Justin Lane, Austin, Texas 78757-2411, was removed as an approved evaluation service.

Notice: Published in the 04/21/2006 issue of the Florida Administrative Weekly.

Adopted: Effective 06/11/2006

Summary: Approved an additional education evaluation service for use by licensure applicants. Center for Professional Engineering Education Services, P. O. Box 720010, Miami, Florida 33172 was added as an approved education evaluation service.

Notice: Published in the 12/08/2006 issue of the Florida Administrative Weekly.

Adopted: Effective 04/09/2007

Summary: Resolved difficulties in demonstrating substantial equivalence for non-EAC/ABET engineering degree holders, foreign or domestic. Changes were:

a) Changed from “ABET programs” to “EAC/ABET programs” as the benchmark for which equivalency must be demonstrated.

b) Changed from “document substantial equivalency” to “document and prove substantial equivalency”.

c) Removed “technology and human affairs” and “history of technology” courses as acceptable college credit hours in humanities and social sciences.

d) Added a distinction between which education evaluation services are approved to evaluate foreign degrees vs. those that are approved to evaluate domestic degrees.

e) The title of Paragraph 61G15-20.007 was changed from “Foreign Degrees” to “Demonstration of Substantial Equivalency”

Notice: Published in the 02/16/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 04/09/2007

Summary: The change is to delete unnecessary language and update existing language.

Notice: Published in the 12/07/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 01/31/2008
61G15-20.007: Demonstration of Substantial Equivalency

(1) Applicants having engineering degrees from programs that are not accredited by EAC/ABET must demonstrate:

(a) 32 college credit hours of higher mathematics and basic sciences.
   1. The hours of mathematics must be beyond algebra and trigonometry and must emphasize mathematical concepts and principles rather than computation. Courses in probability and statistics, differential calculus, integral calculus, and differential equations are required. Additional courses may include linear algebra, numerical analysis, and advanced calculus.
   2. The hours in basic sciences must include courses in general chemistry and calculus-based general physics, with at least a two semester (or equivalent) sequence of study in either area. Additional basic sciences courses may include life sciences (biology), earth sciences (geology), and advanced chemistry or physics. Computer skills and/or programming courses cannot be used to satisfy mathematics or basic science requirements.

(b) 16 college credit hours in humanities and social sciences. Examples of traditional courses in this area are philosophy, religion, history, literature, fine arts, sociology, psychology, political science, anthropology, economics, professional ethics, social responsibility and no more than 6 credit hours of languages other than English or other than the applicant’s native language. Courses such as accounting, industrial management, finance, personnel administration, engineering economics and military training are not acceptable. Courses which instill cultural values are acceptable, while routine exercises of personal craft are not.

(c) 48 college credit hours of engineering science and engineering design. Courses in this area shall have their roots in mathematics and basic sciences but carry knowledge further toward creative application. Examples of approved engineering science courses are mechanics, thermodynamics, electrical and electronic circuits, materials science, transport phenomena, and computer science (other than computer programming skills). Courses in engineering design stress the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation. In order to promote breadth, at least one engineering course outside the major disciplinary area is required.

(d) In addition, evidence of attainment of appropriate laboratory experience, competency in English, and understanding of the ethical, social, economic and safety considerations of engineering practice must be presented. As for competency in English, transcripts of course work completed, course content syllabi, testimonials from employers, college level advanced placement tests, Test of English as a Foreign Language (TOEFL) scores of at least 550 in the paper-based version, or 213 in the computer-based version, will be accepted as satisfactory evidence.

(2) The FBPE Educational Advisory Committee shall make the final decision regarding equivalency of programs and shall make recommendations to the Board as to whether an applicant shall be approved for admittance to the examination or for licensure by endorsement.

(3) The applicant with an engineering degree from a foreign institution must request an evaluation of substantial equivalency of his or her credentials to EAC/ABET standards through either Engineering Credentials Evaluation International, 111 Market Place, #171, Baltimore, Maryland 21202; Center for Professional Engineering Education Services, P.O. Box 720010, Miami, Florida 33172; or Joseph Silny & Associates, Inc., P.O. Box 248233, Coral Gables, Florida 33124. The applicant with an engineering degree from a domestic engineering program not accredited by EAC/ABET must request such an evaluation from Joseph Silny & Associates, Inc., or Center for Professional Engineering Education Services.

(4) Any applicant whose only educational deficiency under subsection (2) involves humanities and social sciences shall be entitled to receive conditional approval to take the Fundamentals examination. Such an applicant shall not become eligible for the Principles and Practice examination.
until satisfactory completion and documentation of the necessary hours in humanities and social sciences as provided in subsection (2).

Specific Authority 471.008 FS. Law Implemented 471.013, 471.015 FS. History–New 7-20-95, Amended 6-5-96, 4-16-98, 1-17-99, 7-28-99, 1-6-02, 6-13-02, 6-30-02, 10-2-03, 6-16-04, 3-13-05, 5-1-05, 6-11-06, 1-29-07, 4-9-07, 1-31-08
61G15-20.0015: Applications for Licensure by Endorsement

Summary: Added language stating that an applicant who has failed the licensing exams more than three (3) times after 7/1/04 must document compliance with Rule 61G15-21.007 as a condition of eligibility for licensure by endorsement.

Added language stating that an applicant for licensure by endorsement who has a foreign degree has demonstrated substantial equivalency to an EAC/ABET accredited engineering program when the applicant has held a valid PE license in another state for at least 15 years AND has at least 20 years professional-level engineering experience.

Notice: Published in the 02/16/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 04/09/2007

Final Rule (04/09/2007)


(1) Any person desiring to be licensed as a professional engineer by endorsement shall submit a completed application form to the Board. The instructions and application Form FBPE/002(06-01), entitled “Application For Licensure By Endorsement”, which is hereby incorporated herein by reference, effective 9-27-01, copies of which may be obtained from the Board office. The Board shall certify as eligible for licensure by endorsement applicants who have completed the application form, remitted the application fee for licensure by endorsement required by Chapter 61G15-24, F.A.C., and who have demonstrated to the Board that:

(a) The applicant meets the current criteria listed in Section 471.013, F.S., (the burden of proving the equivalency of any examination shall rest with the applicant); or

(b) The applicant has an engineering degree from a foreign institution who has demonstrated substantial equivalency to an EAC/ABET accredited engineering program, as required by Rule 61G15-20.007, F.A.C., when such applicant has held a valid professional engineer’s license in another state for 15 years AND has at least 20 years professional-level engineering experience.

(2) If an applicant for licensure by endorsement satisfies any one of the conditions found in Section 471.015(5)(a)1., 2., or 3., F.S., then the Board shall deem that the applicant has passed an examination substantially equivalent to part I, fundamentals, of the engineering examination. If an applicant for licensure by endorsement satisfies the conditions found in Section 471.015(5)(b), F.S., then the Board shall deem that the applicant has passed an examination substantially equivalent to part I, fundamentals, and part II, principles and practice, of the engineering examination.

(3) An applicant for licensure by endorsement who has taken and failed either the fundamentals or the principles and practice examinations more than five (5) times after October 1, 1992, and/or more than three (3) times after July 1, 2004, must document compliance with Rule 61G15-21.007, F.A.C., as a condition of eligibility for licensure by endorsement.

(4) An applicant for licensure by endorsement whose only educational deficiency under subsection 61G15-20.007(2), F.A.C., involves humanities and social sciences and who has held a valid license and practiced in another state or territory of the United States for two (2) years or more shall be deemed to have satisfied that requirement.

(5) The Board shall deem that an applicant for licensure by endorsement who has an engineering degree from a foreign institution has demonstrated substantial equivalency to an EAC/ABET accredited engineering program, as required by Rule 61G15-20.007, F.A.C., when such applicant has held a valid professional engineer’s license in another state for 15 years AND has at least 20 years professional-level engineering experience.
years and has had 20 years of continuous professional-level engineering experience.

(6) An applicant for licensure by endorsement who previously held licensure in the State of Florida and whose license became null and void because of non-renewal must meet all current requirements for initial licensure. Such applicants, if otherwise eligible, shall be subject to disciplinary sanctions as a condition of licensure if it is demonstrated that they practiced engineering during any period their license was delinquent and/or null and void.

61G15-21.007: Re-examination

Summary: Established the minimum passing score to demonstrate an applicant who has failed the licensing examination has acquired the knowledge necessary to demonstrate minimum competency. After failing the licensing exam three (3) times, the applicant must complete twelve (12) college credit hours of college level courses in the area(s) of deficiency. The rule change establishes that the applicant must earn a minimum grade of a “C” or its equivalent in the college level courses.

Notice: Published in the 08/11/2006 issue of the Florida Administrative Weekly. Changed the word “score” to “grade” in a notice of change published in the 02/22/2008 issue of the Florida Administrative Weekly.

Adopted: Effective 04/10/2008

Final Rule (04/10/2008)


If an applicant fails three times to pass the examination, the applicant must take additional courses in order to reapply for examination. The applicant must submit to the Board of Professional Engineers transcripts for the enrollment and completion of twelve (12) college credit hours, with grades no lower than a “C” or its equivalent, of college level courses in the applicant’s area of deficiency. For applicants to take Part I of the engineer examination, such additional courses shall be undergraduate college courses in higher mathematics, basic sciences or engineering as described in paragraphs 61G15-20.007(1)(a), (b) and (c), F.A.C. For applicants to take Part II of the engineer examination, such additional courses shall be upper level or higher courses in engineering, as defined in paragraph 61G15-20.007(1)(c), F.A.C.

Specific Authority 455.217(2) FS. Law Implemented 455.217(2), 471.011, 471.013, 471.015 FS. History—New 1-8-80, Amended 8-25-81, Formerly 21H-21.07, 21H-21.007, Amended 2-14-95, 5-22-01, 12-10-02, 2-3-05, 4-10-08.
61G15-22.003: Qualifying Activities for Area of Practice Requirement

Summary: Eliminated the use of courses taken to satisfy continuing education requirements for P.E. licensure in other states to satisfy the PDH area of practice requirements in Florida.

Notice: Published in the 03/24/2006 issue of the Florida Administrative Weekly.

Adopted: Effective 05/14/2006

Final Rule (05/14/2006)


(1) Successful completion of college courses.
(2) Successful completion of continuing education courses, successful completion of correspondence, televised, Internet, videotaped, and other short courses/tutorials or attending seminars, workshops, or professional and technical presentations at meetings, conventions or conferences presented/sponsored by a provider approved under Rule 61G15-22.011, F.A.C.
(3) Teaching or instructing in subsection (1) or (2) above. However, teaching credit is valid for teaching a course or seminar for the first time only. Teaching credit does not apply to full-time faculty.
(4) Authoring published papers, articles, books, or accepted licensee examination items for NCEES.
(5) Patents.
(6) Active participation in professional or technical societies. Civic or trade organizations do not qualify under this provision. Credit for this activity requires that the licensee serve as an officer of the organization. PDH credits are not earned until the end of each year of completed service.

Specific Authority 455.213(6), 455.2177, 455.2178, 455.2179, 471.008, 471.017(3), 471.019 FS. Law Implemented 455.213(6), 455.2177, 455.2178, 455.2179, 471.008, 471.017(3), 471.019 FS. History–New 9-16-01, Amended 5-14-06.
61G15-22.005: Non-Qualifying Activities

Summary: Added an additional category of activities that don’t qualify as Professional Development Hours. The new category is: "Courses the content of which is below the level of knowledge and skill that reflects the responsibility of engineer in charge."

Notice: Published in the 04/13/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 06/03/2007

Final Rule (06/03/2007)

61G15-22.005: Non-Qualifying Activities.

Activities that do not qualify as Professional Development Hours include but are not limited to the following:

1. Self-generated courses, that being courses generated and presented by the licensee to himself or herself for continuing education credit.
2. Personal self-improvement courses.
3. Equipment demonstrations or trade show displays.
4. Enrollment without attendance.
5. Repetitive attendance or teaching of the same course.
6. Tours of buildings, structures, schools, museums and such unless there is a clear objective to maintain and strengthen competency in a technical field.
7. Regular employment.
8. Personal, estate or financial planning.
9. Courses the content of which is below the level of knowledge and skill that reflects the responsibility of engineer in charge.

Practice Problem #6

List below two (2) mitigating circumstances and two (2) aggravating circumstances that the Board may consider to impose penalties outside the disciplinary guidelines.

Practice Problem #7

List below a minimum of three (3) qualifying activities and two (2) non-qualifying activities to meet the Area of Practice requirements for continuing education.
## Final Rule (06/03/2007)

### 61G15-22.011: Board Approval of Continuing Education Providers.

(1) Applicants for continuing education provider status must meet the requirements of subsections (2) and (3) of this rule to demonstrate the education and/or the experience necessary to instruct professional engineers in the conduct of their practice.

(2) To demonstrate the education and/or the experience necessary to instruct professional engineers in the conduct of their practice for continuing education credit, an applicant for continuing education provider status must be a regionally accredited educational institution, a commercial educator, a governmental agency, a state or national professional association whose primary purpose is to promote the profession of engineering, an engineer with a Florida license to practice engineering who is not under disciplinary restrictions pursuant to any order of the Board, or an engineering firm that possesses an active certificate of authorization issued by the Board pursuant to Section 471.023, F.S.

(3) To allow the Board to evaluate an application for continuing education provider status, the applicant must submit the following:

(a) The name, address and telephone number of the prospective provider;

(b) A description of the type of courses or seminars the provider expects to conduct for credit;

(c) A description of the staffing capability of the applicant;

(d) A sample of intended course materials;

(e) A list of anticipated locations to conduct the courses;

(f) A complete course curriculum for each course the applicant intends to offer;

(g) A description of the means the applicant will use to update the course in response to rule or law changes;

(h) A description of the means the applicant will use to evaluate the licensee’s performance in the course;
(i) A fee of $250.

(4) No engineer may conduct continuing education courses or seminars for credit upon the engineer’s receipt of any disciplinary order from any professional regulatory board in any jurisdiction. Rather, the engineer must notify the Board office within ten (10) days of the engineer’s receipt of any such order.

(5) Should the Board determine that the provider has failed to provide appropriate continuing education services, it shall request that the Department of Business and Professional Regulation issue an order requiring the provider cease and desist from offering any continuing education courses and shall request that the Department revoke any approval of the provider granted by the Board.

(6) No provider may allow an engineer to conduct any course or seminar offered by the provider if that engineer has been disciplined and has not been released from the terms of the final order in the disciplinary case. Upon receipt of notice that an instructor is under discipline, the provider shall, within seven (7) days, write to the Board office and confirm that the engineer is no longer conducting any course or seminar offered by the provider. For the purpose of this subsection, a letter of guidance or a reprimand shall not constitute “under discipline.”

(7) The Board retains the right and authority to audit and/or monitor programs and review records and course materials given by any provider approved pursuant to this rule. The Board shall request that the Department of Business and Professional Regulation revoke the approved status of the provider or reject individual programs given by a provider if the provider disseminated any false or misleading information in connection with the continuing education programs, or if the provider fails to conform to and abide by the rules of the Board. Licensees will not lose credit for attending courses offered by approved providers that are later rejected or stopped by the Board.

(8) Members of the Board of Professional Engineers or the Florida Engineers Management Corporation Board of Directors are prohibited from being a continuing education provider.

(9) The following providers shall be approved as providers until May 31, 2009, and the Board shall accept their courses for continuing education credit:

(a) Educational Institutions teaching college level courses;

(b) Federal and State Governmental Agencies that establish rules, regulations, guidelines, or otherwise have an impact on the practice of engineering; and

(c) State and National Engineering Professional Associations approved by the Board.

Specific Authority 455.213(6), 455.2178, 455.2179, 471.008, 471.017(3), 471.019 FS. Law Implemented 455.213(6), 455.2177, 455.2178, 455.2179, 471.008, 471.017(3), 471.019 FS. History–New 9-16-01, Amended 9-4-02, 12-21-03, 8-8-05, 6-11-06, 1-29-07, 6-3-07.
Summary: Set standards for continuing education courses on Florida laws and rules governing the practice of engineering. Previously, course providers were evaluated and approved to provide courses in laws and rules, without review of individual courses. With this revision, every laws and rules course must be submitted by the provider and approved by the Board.

Notice: Published in the 02/16/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 04/08/2007

Summary: Changed the approval time that a laws and rules course is valid from "two years after the course is approved" to "the biennium during which it was approved".

Notice: Published in the 02/29/2008 issue of the Florida Administrative Weekly.

Adopted: Effective 04/28/2008

Final Rule (04/28/2008)


Each course provider approved by the Board to conduct courses in Florida Laws and Rules must meet the requirements of Rule 61G15-22.011, F.A.C., and shall submit an application for approval of a continuing education course in Laws and Rules. The application shall be submitted on the course approval application provided by the Board and shall include the following:

1. Course materials, including the course syllabus and a detailed outline of the contents of the course;
2. The total number of classroom or interactive distance learning professional development hours; and
3. Course content that includes:
   a. Rules adopted, amended or repealed during the immediately preceding biennium;
   b. Changes to Chapters 455 and 471, F.S., made by the legislature during the preceding biennium;
   c. Case law concerning Chapter 471, F.S.;
   d. A list of resources used to develop the course content;
   e. Application of the provisions of Chapter 471, F.S., to individual disciplinary cases and unlicensed practice cases during the immediately preceding biennium.
4. Qualifications of the instructor(s), including curriculum vitae of the instructor(s), which must demonstrate knowledge of the subject matter and one of the following:
   a. Licensure as a professional engineer;
   b. Licensure as an attorney in the State of Florida.
5. A provider making application to offer interactive distance learning must also submit documents indicating the following:
   a. The means by which the course will demonstrate the ability to interact between the student and course provider by providing answers to inquiries within two business days. The interaction must promote student involvement, and demonstrate that the course measures learning and addresses comprehension of content at regular intervals;
   b. The means by which the course provider is able to monitor student enrollment, participation and course completion;
   c. The means by which the course provider will be able to satisfactorily demonstrate that stated course hours are consistent with the actual hours spent by each student to complete the course;
(d) The means by which the provider will assure qualified instructor(s) will be available to answer questions and provide students with necessary support during the duration of the course; and

(e) That the student will be required to complete a statement that indicates that he/she personally completed each module/session of instruction.

(6) Continuing education course approval is valid for the biennium during which it was approved, provided no substantial change is made in the course and the approval status of the provider has not expired or been suspended or revoked. Substantial changes made in any course will require a new approval of that course. A provider must reapply for course approval ninety (90) days prior to the date of the end of the biennium which would be the expiration of course approval in order to prevent a lapse in course approval.

(7) If a course is approved, the board shall assign the course a number. The course provider shall use the course number in the course syllabus, in all other course materials used in connection with the course and in all written advertising materials used in connection with the course.

Specific Authority 455.2123, 455.213, 455.2179, 471.017(3), 471.019 FS. Law Implemented 455.2123, 455.213, 455.2179, 471.017(3), 471.019 FS. History–New 4-8-07, Amended 4-28-08.
61G15-23.002: Seal, Signature and Date Shall Be Affixed

Summary: The change is to delete unnecessary language and update existing language.

Notice: Published in the 12/07/07 issue of the Florida Administrative Weekly.

Adopted: Effective 01/31/2008

Final Rule (01/31/2008)

61G15-23.002: Seal, Signature and Date Shall Be Affixed.

(1) A professional engineer shall sign his name and affix his seal to all plans, specifications, reports, final bid documents provided to the owner or the owner’s representative, or other documents prepared or issued by said registrant and being filed for public record. The date that the signature and seal is affixed as provided herein shall be entered on said plans, specifications, reports, or other documents immediately under the signature of the professional engineer.

(2) Each sheet of plans and prints which must be sealed under the provisions of Chapter 471, F.S., shall be sealed, signed and dated by the professional engineer in responsible charge. A title block shall be used on each sheet containing the printed name, address, and license number of the engineer or if applicable, the name and license number of the engineer, and if practicing through a duly authorized engineering business, the name, address and certificate of authorization number of the engineering business. Engineers working for local, State or Federal Government agencies shall legibly indicate their name and license number, and may indicate the name and address of the agency. A cover or index sheet for engineering specifications may be used and that sheet must be signed, sealed and dated by those professional engineers in responsible charge of the production and preparation of each section of the engineering specification, and if practicing through a duly authorized engineering business, the name, address and certificate of authorization number of the engineering business, with sufficient information on the cover sheet or index so that the user will be aware of each portion of the specifications for which each professional engineer is responsible. Engineering reports must be signed, sealed and dated on a signature page or cover letter by each professional engineer who is in responsible charge of any portion of the report, and if practicing through a duly authorized engineering business, the name, address and certificate of authorization number of the engineering business. A professional engineer may only seal an engineering report, plan, print or specification if that professional engineer was in responsible charge of the preparation and production of the engineering document and the professional engineer has the expertise in the engineering discipline used in producing the engineering document in question.

(3) A professional engineer should not seal original documents made of mylar, linen, sepia or other materials which can be changed by the entity with whom such document(s) are filed unless the professional engineer accompanies such document(s) with a signed and sealed letter making the receiver aware that copies of the original document as designed by the professional engineer have been retained by the professional engineer and that the professional engineer will not be responsible for any subsequent changes to the reproducible original documents.

(4) A professional engineer should not seal preliminary plans which are not intended for permit, construction, or bidding purposes. If a permitting agency requires that preliminary plans submitted for review purposes be signed and sealed, then the engineer should clearly note such limitations on the face of the plans, by using terms such as “Preliminary,” “For Review Only,” “Not for Construction,” or any other suitable statement which denotes that the documents are for design review only and are not intended for permit, construction, or bidding purposes.

(5) Engineers who wish to sign and seal
electronically transmitted plans, specifications, reports, final bid documents, or other documents shall follow the procedures set forth in Rule 61G15-23.003, F.A.C.

61G15-24.001: Schedule of Fees

Summary: The change below reflects the addition of language approved by the Board on February 23, 2005 but inadvertently left out of the rule notice:
1. Subsection (2)(p) shall now read:
   (p) Engineer Intern Endorsement Fee: $100.00

Notice: Published in the 12/29/2005 issue of the Florida Administrative Weekly.

Adopted: Effective 03/05/2006

Final Rule (03/05/2006)

61G15-24.001: Schedule of Fees.

   (1) Pursuant to Sections 471.011, 471.019, F.S., the Board hereby establishes the following fees for applications, licensing and renewal, temporary registration, late renewal, licensure by endorsement, reactivation fee, and replacement of certificate.

   (2) Engineering licensure fees (individuals and firms):
   (a) Application fee for licensure by examination or endorsement – $125.00 non-refundable.
   (b) Initial license fee – $100.00.
   (c) Biennial renewal fee – $125.00.
   (d) Delinquency fee – $100.00.
   (e) Temporary license (individual) – $25.00.
   (f) Temporary Certificate of Authorization (firm) – $50.00.
   (g) Application fee for a Certificate of Authorization (firm) – $125.00 non-refundable.
   (h) Initial fee for Certificate of Authorization – $125.00.
   (i) Biennial Renewal fee for Certificate of Authorization (firm) – $125.00.
   (j) Inactive Status fee – $125.00.
   (k) Reactivation fee – $150.00.

Specific Authority 455.213, 455.217(3), 455.219, 455.271, 471.011, 471.019 FS. Law Implemented 119.07(1)(a), 455.217(3), (7), 471.011, 471.019 FS. History–New 1-8-80, Amended 8-26-81, 12-19-82, 6-2-83, 2-28-84, Formerly 21H-24.01, Amended 3-10-86, 12-11-86, 3-10-87, 4-12-88, 12-21-88, 1-10-90, 8-15-90, 1-6-93, Formerly 21H-24.001, Amended 11-15-94, 8-10-98, 6-16-99, 5-8-00, 11-15-01, 2-21-02, 9-16-02, 5-9-04, 6-5-05, 3-5-06.
Summary: This rule was repealed because it is being incorporated into other rules through proposed rule changes and therefore it is redundant.

Notice: Published in the 12/14/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 02/11/2008


Specific Authority 471.033(2), 471.008 FS. Law Implemented 471.033(1)(g), 471.025 FS. History–New 1-26-93, Formerly 21H-30.004, Repealed 2-11-08.
**61G15-33.009: Design of Instrumentation and Control Systems**

**Summary:** This rule was repealed because it is being incorporated into other rules through proposed rule changes and therefore it is redundant.

**Notice:** Published in the 12/14/2007 issue of the Florida Administrative Weekly.

**Adopted:** Effective 02/11/2008

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**Final Rule (02/11/2008)**

**61G15-33.009: Design of Instrumentation and Control Systems.**

*Specific Authority 471.008, 471.033(2) FS. Law Implemented 471.033 FS. History–New 5-19-93, Formerly 21H-33.009, Repealed 2-11-08.*
61G15-37.001: Performance Standards and Measurable Outcomes

Summary: Purpose and effect of the change is to describe additional responsibilities of FEMC administrative staff.

Notice: Published in the 02/16/2007 issue of the Florida Administrative Weekly.

Adopted: Effective 04/08/2007

Final Rule (03/05/2006)

61G15-37.001: Performance Standards and Measurable Outcomes.

In order to facilitate efficient and cost effective regulation by the Florida Engineers Management Corporation (“FEMC”), the following performance standards and measurable outcomes are adopted:

(1) FEMC shall make a determination of legal sufficiency within 30 days of receipt of a complaint.

(2) Within fifteen days of receiving a complaint that is determined to be legally sufficient, FEMC shall furnish to the subject or the subject’s attorney a copy of the complaint or document that resulted in the initiation of the investigation.

(3) FEMC shall provide status reports to the Board regarding all outstanding disciplinary cases at every other regularly scheduled meeting of the Board. The status report shall include all legally sufficient disciplinary cases until entry of a final order by the Board. Upon entry of a final order, FEMC shall notify the licensee’s employer of the action taken by the Board.

(4) FEMC shall refer to the board any investigation or disciplinary proceeding not before the Division of Administrative Hearings pursuant to Chapter 120, F.S., or otherwise completed by FEMC within 1 year after the filing of a complaint.

(5) FEMC shall notify the person who filed the complaint of the status of the investigation every six months, including whether probable cause has been found, when the case is agendaed for consideration by the Board and the status of any administrative proceeding or appeal.

(6) At least 90 days before the end of a licensure cycle, FEMC shall forward a licensure renewal notification to active or inactive licensees at the licensee’s last known address of record with FEMC.

(7) At least 90 days before the end of a licensure cycle, FEMC shall forward a notice of pending cancellation of licensure to a delinquent status licensee at the licensee’s last known address of record with FEMC.

(8) Upon receipt of an application for a license, FEMC shall examine the application and, within 30 days after such receipt, notify the applicant of any apparent errors or omissions and request any additional information FEMC is permitted by law to require.

(9) Every application for a license shall be approved or denied within 90 days after receipt of a completed application.

(10) If an applicant seeks a license for an activity that is exempt from licensure, FEMC shall notify the applicant and return any tendered application fee within 30 days after receipt of the original application.

(11) FEMC shall maintain the Board’s web page and update the web page within 14 days of the date the updates go into effect. Administrative complaints shall be posted no later than 30 days after the recommendation by the probable cause panel. All active disciplinary cases shall be posted on the web page, including the final action taken by the Board until the terms of the final order are completed, or until the licensee becomes inactive, retires, relinquishes the license or permits the license to become null and void.

Specific Authority 471.038(3)(m) FS. Law Implemented 471.038(3)(m) FS. History–New 11-12-02, Amended 4-8-07.
Florida Laws and Rules for Engineers

Section 3 – Changes to Chapters 455 and 471 F.S. in the Preceding Biennium
455.2178: Continuing Education Providers

**Summary:** The change was made to require continuing education providers to electronically report completion of courses to the Board more frequently as the renewal date approaches. The minimum requirement set forth for Florida Boards and Departments previously was electronic reporting of course completion by Providers within 30 days after the course is completed. The change requires reporting no later than 10 days after course completion when the renewal deadline is within 30 days or less.

Note that this change does not impact the Florida Board of Professional Engineers because the Board already establishes more stringent requirements in 61G15-22.012 “Obligations of Continuing Education Providers” that electronic reporting of course completion must be done within five (5) days after course completion.

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**Final Rule (The 2007 Florida Statutes)**

455.2178 Continuing education providers.

(1) Each continuing education provider shall provide to the department such information regarding the continuing education status of licensees as the department determines is necessary to carry out its duties under s. 455.2177, in an electronic format determined by the department. After a licensee's completion of a course, the information must be submitted to the department electronically no later than 30 calendar days thereafter. However, the continuing education provider shall electronically report to the department completion of a licensee's course within 10 business days beginning on the 30th day before the renewal deadline or prior to the renewal date, whichever occurs sooner. The foregoing applies only if the profession has not been granted a waiver from the monitoring requirements under s. 455.2177. Upon the request of a licensee, the provider must also furnish to the department information regarding courses completed by the licensee.

(2) Each continuing education provider shall retain all records relating to a licensee's completion of continuing education courses for at least 4 years after completion of a course.

(3) A continuing education provider may not be approved, and the approval may not be renewed, unless the provider agrees in writing to provide such cooperation under this section and s. 455.2177 as the department deems necessary or appropriate.

(4) The department may fine, suspend, or revoke approval of any continuing education provider that fails to comply with its duties under this section. Such fine may not exceed $500 per violation. Investigations and prosecutions of a provider's failure to comply with its duties under this section shall be conducted pursuant to s. 455.225.

(5) For the purpose of determining which persons or entities must meet the reporting, recordkeeping, and access provisions of this section, the board of any profession subject to this section, or the department if there is no board, shall, by rule, adopt a definition of the term "continuing education provider" applicable to the profession's continuing education requirements. The intent of the rule shall be to ensure that all records and information necessary to carry out the requirements of this section and s. 455.2177 are maintained and transmitted accordingly and to minimize disputes as to what person or entity is responsible for maintaining and reporting such records and information.

(6) The department may adopt rules under ss. 120.536(1) and 120.54 to implement this section.

Florida Laws and Rules for Engineers

Section 4 – Overview of the Disciplinary Process
**Filing of a Complaint**

The disciplinary process is started with the filing of a complaint. Anyone can file a complaint against a licensed engineer. It is not necessary that the complainant also be a licensed engineer. The complainant has the option of signing the complaint or remaining anonymous.

The Board will investigate a **signed** complaint if it is:

a. Submitted in writing,

b. Signed by the complainant, and

c. Legally sufficient.

The Board will investigate an **anonymous** complaint if it is:

a. Submitted in writing,

b. Legally sufficient,

c. A substantial violation, and

d. Believed that the allegation is true after an initial review.

A complaint is legally sufficient if it contains ultimate facts that show that a violation of any practice act or the Board’s Rules has occurred. In order to determine legal sufficiency, FEMC may require supporting information or documentation. The investigation may continue and the Board may take appropriate final action on a complaint, even though the original complainant withdraws it or otherwise indicates a desire not to cause the complaint to be investigated or prosecuted to completion.

Within fifteen (15) days of receiving a complaint which is determined to be legally sufficient, the FEMC must furnish the subject of the complaint with a copy of the complaint. The subject has twenty (20) days to provide a written response to the complaint.

**Disposal of Violations**

Depending on the nature of the offense, there are a number of means by which violations may be disposed of. Many violations are disposed of through the Administrative Complaint process. However, some lesser violations may be handled through alternative means.

<table>
<thead>
<tr>
<th>Offenses</th>
<th>Notice of Noncompliance</th>
<th>Mediation</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Failure to date documents when affixing signature and seal</td>
<td>- Practice with an improper seal</td>
<td>- Practiced or offered to practice engineering through a firm that has not been duly certified.</td>
<td></td>
</tr>
<tr>
<td>- Practice with an inactive or delinquent license less than (1) month</td>
<td>- Failure to date documents when affixing seal and signature.</td>
<td>- Practice with an inactive or delinquent license more than (1) month or if a Notice of Noncompliance has previously been issued for the same offense.</td>
<td></td>
</tr>
<tr>
<td>- Firm practicing without a current certificate of authorization less than (1) month</td>
<td>-</td>
<td>- Firm practicing without a current certificate of authorization more than (1) month or if a Notice of Noncompliance has previously been issued for the same offense.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>- Failure to notify the Board of a change in the principal officer of the firm within (1) month when the principal officer is the qualifying engineer for the firm.</td>
<td></td>
</tr>
</tbody>
</table>
Administrative Complaint Process

Most violations are disposed of through the Administrative Complaint process. One of the functions of the Florida Board of Engineers is to act on administrative complaints. The Board reviews each disciplinary case and issues a Final Order.

The process is as follows:

1. A complaint is filed with the Florida Engineers Management Corporation (FEMC).
2. The complaint is reviewed for legal sufficiency.
   a. If there is a determination of legal sufficiency, the file is assigned to an investigator.
   b. If there is a determination of no legal sufficiency, the case is closed by memo to the Executive Director.
3. Once the investigation is complete, the case is presented to the Probable Cause Panel. If probable cause is found, then an administrative complaint is issued. The prosecuting attorney must notify the engineer. The engineer has three options. He/she can:
   a. Request an informal hearing in front of the board, or
   b. Request a formal hearing before an administrative law judge (ALJ), or
   c. Agree to a settlement stipulation.
4. Regardless of the option chosen, the Board makes the final determination regarding the penalties, which are issued in a Final Order by the Board.

Disciplinary Guidelines

The Board operates under certain guidelines that prescribe a minimum and maximum penalty that will normally be imposed for each offense. In 471.033 (1) F.S. and 61G15-19.001 F.A.C., the offenses are identified for which disciplinary action may be taken. The normal ranges of penalties are set forth in Chapter 471.033 (3) F.S. and these are further clarified in 61G15-19.004 F.A.C.

(a) Denial of an application for licensure.
(b) Revocation or suspension of a license.
(c) Imposition of an administrative fine not to exceed $5,000 for each count or separate offense.
(d) Issuance of a reprimand.
(e) Placement of the licensee on probation for a period of time and subject to such conditions as the board may specify.
(f) Restriction of the authorized scope of practice by the licensee.
(g) Restitution.

Aggravating / Mitigating Circumstances

While there are guidelines for the Board to follow when determining the penalty for each offense, the Board does have the latitude to deviate from the guidelines. The guidelines are intended to address normal penalties. However, where aggravating circumstances exist, the Board may impose a punishment that is more severe than prescribed in the guidelines. Likewise, the Board may impose a less severe punishment when mitigating circumstances exist.

Also, the fact that an Administrative Law Judge or a Probable Cause Panel was not aware of mitigating or aggravating circumstances prior to recommending a penalty, does not prevent the Board from considering such circumstances that are brought to the Board’s attention prior to issuance of a Final Order.

Aggravating circumstances may justify the Board to deviate from the disciplinary guidelines and cause an enhancement of a penalty beyond
the maximum penalty prescribed in the guidelines. Aggravating circumstances may include:

- A history of previous violations
- In cases of negligence, the magnitude of the project and extent of the damage inflicted on the public
- Violation of professional practice acts in other jurisdictions
- Violations following the previous issuance of a letter of guidance to the licensee

**Mitigating circumstances** may justify the Board to deviate from the disciplinary guidelines and cause a lessening of a penalty beyond the minimum penalty prescribed in the guidelines. Mitigating circumstances may include:

- A lack of previous history of violations
- In cases of negligence, the minor nature of the project and a lack of danger to the public
- Restitution of damages suffered by the licensee’s client
- The licensee’s professional standing among his peers, including continuing education
- Measures taken by the licensee and his firm to insure that similar violations do not recur in the future

**The Buck Stops Here!**

Following the discussion above on mitigating and aggravating circumstances, it is appropriate to point out the following:

The Board has the final say in the determination of penalties and is not obligated to follow the guidelines, recommendations or settlement stipulations that are made prior to the Board’s issuance of its Final Order.

This bears repeating:

1. The Board is not obligated to impose the same penalty that is recommended by an Administrative Law Judge (ALJ) in a Recommended Order.
2. The Board is not obligated to impose the same penalty that is recommended by a Probable Cause Panel.
3. The Board is not obligated to accept a settlement stipulation.

The Board may choose to set aside the judgment of an ALJ, reject the recommendation of a Probable Cause Panel, or reject a settlement stipulation, and impose a different penalty at the Board’s discretion. In the disciplinary cases from the previous biennium that follow in the next section, there are numerous occasions when the Board rejects a recommendation and subsequently imposes a different penalty.

**The Probable Cause Panel**

The Probable Cause Panel (PCP) reviews the facts resulting from an investigation performed by the FEMC. The PCP is also required to consider the subject’s response to the complaint as part of the evidence. If probable cause is found that one or more violations have occurred, then an Administrative Complaint is issued. The PCP also typically recommends a punishment, although the recommendation is not always followed. The punishment is sometimes reduced by a settlement stipulation. And the Board is also empowered to impose a different punishment than recommended by the PCP.

If the information submitted to the PCP is not sufficient to determine probable cause, then the case is dismissed and the information is not made public. Also, the PCP may issue a letter of guidance to the licensee in lieu of finding probable cause, in which case the letter of guidance and the information in the investigation
Disputing the Facts

After an Administrative Complaint is issued by the PCP, the engineer and his attorney must determine a path forward based on whether there is a dispute over the facts of the case. If the facts are disputed, the engineer may elect to have a formal hearing before an Administrative Law Judge (ALJ). The ALJ will hear the testimony of both sides and issue a ruling regarding the facts of the case. The ALJ will also issue a recommended Final Order to the Board. However, the Board is not obligated to follow the recommended Final Order.

If there is no dispute over the facts of the case, the engineer can elect to present his case to the Board in an informal hearing. In the informal hearing, the engineer and his attorney may argue interpretations of the law or present mitigating circumstances in the hopes of reducing the penalties imposed by the Board. Disputing the facts of the case is not allowed in an informal hearing.

Settlement Stipulation

In lieu of a formal or informal hearing, the engineer may enter into a settlement stipulation. This is analogous to a “plea bargain” in the criminal court system. Starting with the punishment recommended by the PCP, the two sides negotiate a penalty. Again, the Board is not obligated to accept the terms of a settlement stipulation. The Board may elect to impose the original penalty recommended by the PCP or a different penalty altogether.

Default Judgment

There is one other option available to the subject of an Administrative Complaint: Do nothing. However, this course of action – or rather course of inaction – is not recommended. If the engineer fails to respond to an Administrative Complaint, the Board will render a default judgment. In the absence of any explanation from the engineer or any assurances that he/she will not violate the Rules again, the penalties meted out by the Board can be very severe.

Practice Problem #8

What role does a Probable Cause Panel play in the disciplinary process?
Practice Problem #9
When can a Respondent request a formal hearing in front of an Administrative Law Judge?

Practice Problem #10
List below two (2) out of the three (3) options available to an engineer when an administrative complaint is filed against him.
Figure 1 This figure maps the Florida disciplinary process.
Florida Laws and Rules for Engineers

Section 5 – Disciplinary Cases During the Preceding Biennium
Disciplinary Case #1

FEMC Case No. 2006067898

Source: FBPE Meeting Minutes – June ’07

Charges: One (1) count of negligence

Legal Counsel: Bruce E. Loren, Esquire

PCP: Matthews, Seckinger, Hogenkamp

Board Discussion and Final Order

Respondent was not present.

Respondent has been charged by Administrative Complaint with one count of engaging in negligence in the practice of engineering in relation to the Golden Bear Plaza project. Pursuant to a Final Order Approving Settlement Stipulation in Case Number 2004038064, Respondent agreed to submit for review a list of projects at six and eighteen month intervals. Upon review, the Board Consultant noted deficiencies in both the calculations and drawings for the Golden Bear project.

Respondent has entered into settlement with FEMC for an administrative fine of $1,000.00; a reprimand; probation for six months to run consecutive with Case # 2004038064 with the terms that he submit a list of completed projects for review on July 20, 2007.

PCP Recommendation: Reprimand; $3,000 administrative fine ($3,000.00 per count for (1) count); subject will be placed on (6) months probation to run consecutive with Case# 2004038064; and plan review at 24 months from Case #2004038064 Final Order Date.

Mr. Burke asked why the fine was reduced from the recommendation from the Probable Cause Panel. Mr. Rimes stated he could not speak for Mr. Creehan, in general, actions after Probable Cause sometimes present a situation that calls for stipulating to a lower fine.

Commentary

As part of the Final Order in a previous case, the respondent submitted drawings for the Golden Bear project to be reviewed by the Board. The new drawings had deficiencies and thus new negligence charges were filed. It seems that the Respondent would have implemented additional quality control measures knowing that the work would be scrutinized by the Board.

This case demonstrates that the Board does not always accept the terms of a settlement stipulation.

Note that the Board often stipulates in Final Orders for negligence that the respondent submit plans for review in the future. The negligence may indicate that the engineer lacks attention to detail, or has a poor quality control system. In any case, the plan review is designed to detect whether the engineer has “cleaned up his act”.

Case Law Reference

The violation in this case was negligence. Negligence is defined in 61G15 as follows:
A professional engineer shall not be negligent in the practice of engineering. The term negligence set forth in Section 471.033(1)(g), F.S., is herein defined as the failure by a professional engineer to utilize due care in performing in an engineering capacity or failing to have due regard for acceptable standards of engineering principles. Professional engineers shall approve and seal only those documents that conform to acceptable engineering standards and safeguard the life, health, property and welfare of the public.
Disciplinary Case #2

FEMC Case No. 2005004444
Source: FBPE Meeting Minutes – June ’07
Charges: One (1) count of practicing engineering on an inactive license.
Legal Counsel: John W. Foster, Esquire
PCP: Matthews, Seckinger, Hogenkamp

Board Discussion and Final Order

Respondent was not present.

Respondent has been charged by an Administrative Complaint of one charge of practicing engineering on an inactive license. Respondent voluntarily placed his license on inactive status on January 6, 2003, and it remained inactive until December 1, 2005. During that time, Respondent represented himself to Kenneth Revell as a civil engineer and prepared an engineer’s report on Mr. Revell’s hurricane damaged home.

Respondent has entered into a stipulation with FEMC for costs of $332.00 and he agrees to complete the Study Guide prepared by the Board of Professional Engineers within 30 days as well as a Board-approved course in Engineering Professionalism and Ethics within one year.

PCP Recommendation: Reprimand; $200.00 administrative fine ($100.00 per month for 2 months); costs of $132.00; Restitution to Kenneth W. Revell; Board approved course in Engineering Professionalism and Ethics; study guide; and appearance before the Board to explain: his understanding of provisions on license. The Board inquired why the settlement stipulation did not include the penalty recommended by the PCP. Mr. Rimes stated the main recommendations of the PCP appear in the Stipulation, he suggested the Board did not have the authority to award restitution. The Board expressed concern that Respondent was not required to appear in front of the Board. This concern was noted for future cases.

Upon a motion by Dr. Bauer and seconded by Mr. Charland, the stipulation was approved.

Commentary

In this case, the Board again questioned why the settlement stipulation did not include the penalty recommended by the PCP. Note that the Board was concerned that the settlement stipulation did not require the Respondent to appear before the Board. However, the Board did finally agree to accept the settlement stipulation.

Case Law Reference

The violation in this case was practicing engineering on an inactive license. The appropriate reference in Chapter 471 of the Florida Statutes is as follows:

471.003

No person other than a duly licensed engineer shall practice engineering or use the name or title of “licensed engineer,” “professional engineer,” or any other title, designation, words, letters, abbreviations, or device tending to indicate that such person holds an active license as an engineer in this state.
Disciplinary Case #3

FEMC Case No. 2005047186

Source: FBPE Meeting Minutes – June ’07

Charges: One (1) count of misconduct

Legal Counsel: Edwin Bayo, Esquire

PCP: Matthews, Seckinger, Burke

Board Discussion and Final Order

Respondent was present with his counsel Edwin Bayo.

This case arises from the complaint of one P.E. who served as an expert in a motor vehicle accident case complaining that Subject, representing the opposing party in litigation, gave unfounded opinions.

The primary challenged opinion found that a van’s lights were off at the time of the accident because examination of filament in one of its taillights did not show “hot shock”. Hot shock is deformation of a ductile hot filament from impact when a light is on; if a light is off, a cold filament will not deform. In the accident the van traveling between 55 and 65 mph on U.S. 301, collided with a car that had pulled out in front of it from a side road. The front of the van was smashed and the front lights broken.

The accident occurred on at 10:30 p.m., in October on a moonless night. The intersection corners had no streetlights or structures. The intersection sits in a wide curve of U.S. 301. The first eyewitness on the scene testified that he turned off the light switch of the van because of the dinging that occurred when the van door was opened. Subject said the eyewitness was wrong because subject identified a stain in the road in an FHP photo from the night of the accident as battery acid and therefore the battery would not have powered the chime.

A FEMC consultant found that the hot shock literature does not support a conclusion that the lack of deformation means a taillight was not on, that the opinion the headlights were off conflicted with witness testimony, and the opinion could not account for how a drive could negotiate a curved road with no lights.

On September 7, 2006 the PCP authorized the filing of an Administrative Complaint charging Respondent with one count of violating Section 471.033(1)(g) (misconduct) by opining on an engineering subject without “being informed as to the facts, and thus being unable to form a sound opinion, or by being deceptive or misleading in a professional report or testimony.”

A formal hearing was requested and communications between counsel commenced. It was determined that the most efficacious manner to proceed was for counsel to jointly direct the FEMC consultant to analyze the facts using the legal standard that would be applied to determine whether Respondent’s opinion was within the bounds of acceptable engineering opinion. By letter dated April 6, 2007 the FEMC consultant rendered his opinion and the parties subsequently determined that a settlement stipulation would be the appropriate resolution of this matter. The stipulation provides for $1,000.00 Fine, costs of $3,000.70, an Appearance before the Board, and 1 year Probation with the Course in Professionalism & Ethics & the Study Guide.

PCP Recommendation: Reprimand; $1000 fine, costs ($1464.15); 1-year probation (Course in Professionalism & Ethics & Study Guide).

Edwin Bayo, Esquire, entered his appearance.

Upon a motion by Dr. Bauer seconded by Mr. Charland the stipulation was accepted.

Commentary

This case is quite interesting and a bit unusual. Many of the cases that are heard by the Board involve negligence, unlicensed practice, or plan stamping. In this case, the respondent is charged with misconduct for opining on an engineering subject without “being informed as to the facts, and thus being unable to form a
sound opinion, or by being deceptive or misleading in a professional report or testimony”.

Engineers are sometimes called upon to be expert witnesses in civil and criminal court cases. This case demonstrates that the engineer is obligated to be informed of the facts and to provide a sound opinion that is based on engineering principles, not biased to further his client’s legal argument.

### Case Law Reference

The violation in this case was misconduct. Misconduct is defined in Chapter 61G15 of the Florida Administrative Code as follows:

**61G15-19.001 (6)**

(6) A professional engineer shall not commit misconduct in the practice of engineering. Misconduct in the practice of engineering as set forth in Section 471.033(1)(g), F.S., shall include, but not be limited to:

(a) Expressing an opinion publicly on an engineering subject without being informed as to the facts relating thereto and being competent to form a sound opinion thereupon;

(b) Being untruthful, deceptive or misleading in any professional report, statement or testimony whether or not under oath or omitting relevant and pertinent information from such report, statement or testimony when the result of such omission would or reasonably could lead to a fallacious conclusion on the part of the client, employer or the general public;

(c) Performing an engineering assignment when not qualified by training or experience in the practice area involved;

1. All professional engineer asbestos consultants are subject to the provisions of Sections 455.301 - .309, F.S., Chapter 471, F.S., and Rule 61G15-19, F.A.C., and shall be disciplined as provided therein.

2. The approval of any professional engineer as a “special inspector” under the provisions of Chapter 553, F.S., does not constitute acceptance by the Board that any such professional engineer is in fact qualified by training or experience to perform the duties of a “special inspector” by virtue of training or experience. Any such professional engineer must still be qualified by training or experience to perform such duties and failure to be so qualified could result in discipline under this chapter or Chapter 471, F.S.;

(d) Affixing a signature or seal to any engineering plan of document in a subject matter over which a professional engineer lacks competence because of inadequate training or experience;

(e) Offering directly or indirectly any bribe or commission or tendering any gift to obtain selection or preferment for engineering employment with the exception of the payment of the usual commission for securing salaried positions through licensed employment agencies;

(f) Becoming involved in a conflict of interest with an employer or client, without the knowledge and approval of the client or employer, but if unavoidable a professional engineer shall immediately take the following actions:

1. Disclose in writing to his employer or client the full circumstances as to a possible conflict of interest; and

2. Assure in writing that the conflict will in no manner influence the professional engineer’s judgment or the quality of his services to his employer or client; and

3. Promptly inform his client or employer in writing of any business association, interest or circumstances which may be influencing his judgment or the quality of his services to his client or employer;

(g) Soliciting or accepting financial or other valuable considerations from material or equipment suppliers for specifying their products without the written consent to the engineer’s employer or client;

(h) Soliciting or accepting gratuities directly or indirectly from contractors, their agents or other parties dealing with the professional engineer’s client or employer in connection with work for which the professional engineer is responsible
without the written consent of the engineer’s employer or client;

(i) Use by a professional engineer of his engineering expertise and/or his professional engineering status to commit a felony;

(j) Affixing his seal and/or signature to plans, specifications, drawings or other documents required to be sealed pursuant to Section 471.025(1), F.S., when such document has not been personally prepared by the engineer or prepared under his responsible supervision, direction and control;

(k) A professional engineer shall not knowingly associate with or permit the use of his name or firm name in a business venture by any person or firm which he knows or has reason to believe is engaging in business or professional practices of a fraudulent or dishonest nature;

(l) If his engineering judgment is overruled by an unqualified lay authority with the results that the public health and safety is threatened, failure by a professional engineer to inform his employer, responsible supervision and the responsible public authority of the possible circumstances;

(m) If a professional engineer has knowledge or reason to believe that any person or firm is guilty of violating any of the provisions of Chapter 471, F.S., or any of these rules of professional conduct, failure to immediately present this information to FEMC;

(n) Violation of any law of the State of Florida directly regulating the practice of engineering;

(o) Failure on the part of any professional engineer or certificate holder to obey the terms of a final order imposing discipline upon said professional engineer or certificate holder;

(p) Making any statement, criticism or argument on engineering matters which is inspired or paid for by interested parties, unless the professional engineer specifically identifies the interested parties on whose behalf he is speaking and reveals any interest he or the interested parties have in such matters;

(q) Sealing and signing all documents for an entire engineering project, unless each design segment is signed and sealed by the professional engineer in responsible charge of the preparation of that design segment;

(r) Revealing facts, data or information obtained in a professional capacity without the prior consent of the professional engineer’s client or employer except as authorized or required by law.
Disciplinary Case #4

FEMC Case No. 2006015054
Source: FBPE Meeting Minutes – Feb '07
Charges: Two (2) counts of negligence
Legal Counsel: None
PCP: Matthews, Seckinger, Burke

Board Discussion and Final Order

Respondent was not present for his hearing and was not represented by counsel.

Respondent has been charged with two counts of negligence for signing and sealing deficient calculations for residential irrigation piping sheets for two projects.

On July 10, 2006, an Administrative Complaint was filed and sent to Mr. Matonte by certified mail, along with an Election of Rights form and an Explanation of Rights form. The aforementioned certified mail returned unclaimed on August 3, 2006. On August 3, 2006, a FEMC Investigator was asked to hand serve Respondent personally.

The investigator was unsuccessful in his attempts to hand serve Respondent. On December 22, 2006, a legal notice was placed in the St. Petersburg Times. The notice indicates that Respondent has until January 31, 2007, to contact the FEMC Clerk or this matter will be presented at a hearing pursuant to Chapter 120, Florida Statutes.

The Explanation of Rights form advised Respondent that if he failed to make an election in this matter within twenty-one days from receipt of the Administrative Complaint, his failure to do so may be considered a waiver and the Board may proceed to hear his case. Respondent failed to request a hearing.

The FEMC Prosecutor filed a Motion for Default.

PCP Recommendation: $5,000.00 administrative fine; costs; one year suspension; probation in case number 00-0084 shall be tolled during the period of suspension; and an appearance before the Board to explain what he will do for employment during the period of suspension and which discipline he intends to practice after suspension is completed.

Due to Respondent’s failure to respond to this complaint, the FEMC Prosecutor requested the Probable Cause Panel’s recommendation be amended to reflect a revocation and $5,000.00 administrative fine.

Upon a motion by Mr. Tomasino seconded by Ms. Hogenkamp, a motion for default was granted.

Commentary

This case demonstrates the danger of simply ignoring an Administrative Complaint. The PCP did not originally recommend revocation of the Respondent’s license. However, the FEMC prosecutor recommended revocation at the Board meeting simply because the Respondent ignored the charges.

Case Law Reference

The violation in this case was negligence. In Disciplinary Case #1 above, the definition of negligence was given, as defined in Chapter 61G15 of the Florida Administrative Code. Below is the reference from the Florida Statutes 471.033 (1) (g) indicating that negligence is a violation subject to disciplinary action:

471.033 Disciplinary proceedings

(1) The following acts constitute grounds for which the disciplinary actions in subsection (3) may be taken:

(g) Engaging in fraud or deceit, negligence, incompetence, or misconduct, in the practice of engineering.
Disciplinary Case #5

FEMC Case No. 2006027031 & 2006052707

Source: FBPE Meeting Minutes – Feb ‘07

Charges:
- One (1) count of plan stamping;
- Two (2) counts of negligence;
- Four (4) additional counts of misconduct and negligence related to drawings submitted to the Board for project review.

Legal Counsel: Edwin Bayo

PCP: Matthews, Seckinger, Burke

Board Discussion and Final Order

Note: Cases 2006027031 and 2006052707 were discussed on Wednesday, February 21, 2007. A court reporter was not present.

Respondent was not present for hearing but was represented by counsel, Edwin A. Bayo, Esquire. Case numbers 2006027031 and 2006052707 were discussed simultaneously.

In case number 2006027031, Respondent has been charged by an Administrative Complaint with one count of plan stamping, two counts of negligence; and one count for violating a rule of the Board pertaining to plans for an Owens Residence project.

PCP Recommendation: Reprimand; $12,000.00 administrative fine ($3,000.00 per count for four counts); costs of $1,062.45; 2 yrs. suspension; and an appearance before the Board to explain what he plans to do while under suspension. Following suspension, he will be placed on 2 years probation with plan review at 6 and 18 months; and make an additional appearance before the Board to explain his plans for improving quality control and responsible methodology when signing/sealing projects.

In case number 2006052707, Respondent has been charged by an Administrative Complaint with four counts relating to drawings submitted for his project review. Respondent was charged with misconduct and negligence.

PCP Recommendation: Reprimand; $20,000.00 administrative fine ($5,000.00 per count for four counts); suspension of licensure for two years or Voluntary Relinquish his P.E. license; he shall make an appearance before the Board to explain what his plans will be while under suspension.

Respondent has entered into a stipulation with FEMC, consolidating both cases, for costs of $1,062.45 and he agrees to Voluntarily Relinquish his license and never reapplies for licensure as a Professional Engineer in the State of Florida.

Upon a motion by Mr. Charland seconded by Mr. Rivera, the Settlement Stipulation was approved.

Commentary

This case demonstrates how significant the penalties can be for violations, such as plan stamping, negligence and misconduct. For the two cases combined, the PCP recommended a total of $32,000 in administrative fines, in addition to license suspension followed by probation. The Respondent chose in this case to voluntarily relinquish his license.

Case Law Reference

One of the charges in this case was plan stamping. Plan stamping is quite simply when an engineer seals a drawing or other document that was not prepared by him or under his direct supervision and control. Below is the language from Chapter 471 F.S. related to plan stamping:
471.033 Disciplinary proceedings

(1) The following acts constitute grounds for which the disciplinary actions in subsection (3) may be taken:

(j) Affixing or permitting to be affixed his or her seal, name, or digital signature to any final drawings, specifications, plans, reports, or documents that were not prepared by him or her or under his or her responsible supervision, direction, or control.
Florida Laws and Rules for Engineers

Section 6 – Resources Used to Develop This Course
Resources Used to Develop This Course

Below is a list of resources used in the development of this course:

Florida Administrative Code, Chapter 61G15, Board of Professional Engineers

Florida Statutes, Title XXXII, Chapter 455 – Business and Professional Regulation: General Provisions
http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0471/ch0471.htm

Florida Statutes, Title XXXII, Chapter 471 – Engineering
http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0455/titl0455.htm&StatuteYear=2007&Title=%2D%3E2007%2D%3EChapter%20455

Florida Administrative Weekly
https://www.flrules.org/

FBPE Meeting Minutes – June ’07
http://www.fbpe.org/documents/agenda/June_2007_Joint_Board_meeting_minutes_final.doc

FBPE Meeting Minutes – Feb ’07
http://www.fbpe.org/documents/agenda/February_2007_Board_Minutes_final.doc
Florida Laws and Rules for Engineers

Section 7 – Answers to Practice Problems
Practice Problem #1

List below the Chapters of the Florida Statutes and the Florida Administrative Code that are applicable to engineers.

Answer:

**Florida Statutes:**

*Chapter 455, Business and Professional Regulation, General Provisions*

*Chapter 471, Engineering*

**Florida Administrative Code:**

*Chapter 61G15*

Practice Problem #2

Describe below the respective roles of the legislature and the Board in enacting laws and rules for Florida Engineers.

Answer:

The legislature is responsible for adopting, amending and repealing the Florida Statutes, which are designed to provide agencies with the authority to make rules and carry out the statute.

The Board is responsible for adopting, amending and repealing administrative rules for engineers in Chapter 61G15 of the Florida Administrative Code.

Practice Problem #3

1. What functions does the FEMC provide for the Board?

2. What roles does the Board and the FEMC have, respectively, in the disciplinary process, including investigation, prosecution, probable cause determination and issuing Final Orders?

Answer:

1. The FEMC provides administrative, investigative and prosecutorial services to the Board.

2. The FEMC is responsible for investigation and prosecution. The Board is responsible for determining Probable Cause through the use of a Probable Cause Panel. And the Board is responsible for issuing Final Orders.
Practice Problem #4

Describe below, in general terms, the range of penalties prescribed in the Disciplinary Guidelines.

Answer:

At a minimum, the Board can issue a reprimand. The most severe penalty is revocation of the violator’s license. In between these two extremes, the Board has a variety of options, including issuing administrative fines up to $5,000 per count, suspending the offender’s license, or placing the licensee on probation.

Practice Problem #5

1. Describe below, in general terms, the degree of control that must be exercised by the Engineer of Record.

2. What types of questions should an engineer in responsible charge be able to answer regarding his proficiency, decision-making and degree of involvement on a particular project?

Answer:

1. Personally makes engineering decisions or reviews and approves proposed decisions prior to their implementation, including the consideration of alternatives, whenever engineering decisions which could affect the health, safety and welfare of the public are made. In making said engineering decisions, the engineer shall be physically present or, if not physically present, be available in a reasonable period of time, through the use of electronic communication devices, such as electronic mail, videoconferencing, teleconferencing, computer networking, or via facsimile transmission. Also, judges the validity and applicability of recommendations prior to their incorporation into the work, including the qualifications of those making the recommendations.

2. The engineer shall be capable of answering questions relevant to the engineering decisions made during the engineer’s work on the project, in sufficient detail as to leave little doubt as to the engineer’s proficiency for the work performed and involvement in said work. It is not necessary to defend decisions as in an adversary situation, but only to demonstrate that the engineer in responsible charge made them and possessed sufficient knowledge of the project to make them.
Practice Problem #6

List below two (2) mitigating circumstances and two (2) aggravating circumstances that the Board may consider to impose penalties outside the disciplinary guidelines.

Answer:

Mitigating circumstances:

1. The minor nature of the project and lack of danger to the public due to the licensee’s negligence.
2. Lack of previous disciplinary history in Florida and other jurisdictions.
3. Restitution of any damages suffered by the licensee’s client.
4. The licensee’s professional standing among his peers, including continuing education.
5. Steps taken to ensure that a similar violation will not reoccur.

Aggravating circumstances:

1. History of previous violations.
2. In the case of negligence, the magnitude and scope of the project and the damage inflicted on the public.
3. Evidence of violations in other jurisdictions.
4. Violations after the licensee has already been warned via a letter of guidance.

Practice Problem #7

List below a minimum of three (3) qualifying activities and two (2) non-qualifying activities to meet the Area of Practice requirements for continuing education.

Answer:

Qualifying Activities:

1. Completion of college courses.
2. Completion of continuing education courses.
3. Teaching a college course or continuing education course.
4. Authoring published papers, articles, books, or licensee examination questions.
5. Serving as an officer in a professional or technical society.

Aggravating circumstances:

1. Self-generated courses.
2. Personal self-improvement courses.
3. Equipment demonstrations and trade show displays.
4. Enrollment in an activity without attendance.
5. Repetitive attendance or teaching of a course.
6. Tours of building, unless there’s a clear objective to maintain and strengthen competency in a technical field.
7. Regular employment.
8. Personal, estate or financial planning.
9. Courses with content that is below the level of knowledge and skill that reflects the responsibility of engineer in charge.
Practice Problem #8

What role does a Probable Cause Panel play in the disciplinary process?

Answer:

The Probable Cause Panel (PCP) reviews the facts resulting from an investigation performed by the FEMC. If probable cause is found that one or more violations have occurred, then the PCP issues an Administrative Complaint. The PCP also typically recommends penalties to the Board in each case that it reviews.

Practice Problem #9

When can a Respondent request a formal hearing in front of an Administrative Law Judge?

Answer:

A respondent can only request a formal hearing in front of an Administrative Law Judge when there are disputed facts in the case. If the engineer simply wishes to argue interpretations of the law or present mitigating circumstances, then an informal hearing in front of the Board is required.

Practice Problem #10

List below two (2) out of the three (3) options available to an engineer when an administrative complaint is filed against him.

Answer:

1. Request a formal hearing in front of an Administrative Law Judge.
2. Request an informal hearing in front of the Board.
3. Negotiate a settlement stipulation with the prosecuting attorney.
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Individual licensees cannot report Laws and Rules course completion on the Board website. To verify that your Laws and Rules course has been recorded, select the link “View Continuing Education” from the Board’s renewal site. If the “shortfall hours” for Laws and Rules are shown as zero (0.00), the course has been credited.

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You must self-report the Area of Practice hours on the Board’s website. Please remember to only report the 4 PDH for the Area of Practice course(s). You will not be able to report the completion of the Laws and Rules course.

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*Reporting schedule may be more frequent during the last several weeks before the deadline to renew.*