Variation in Concrete Strength and Air Content Due to Fly Ash

Part VI of Concrete Quality Series

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Parts I and II of the Concrete Quality series discussed that a good measure and benchmark of concrete quality is the Standard Deviation (SD) of compressive strength test results. The primary factors that impact the SD are variability associated with materials, production and testing. In order to reduce the strength standard deviation the concrete producer needs to manage those aspects of variability that can be controlled. This article discusses concrete strength and air content variability due to variation of fly ash from a single source.

Variability of fly ash shipments from a given source

A 1998 PCA/NRMCA survey reported that fly ash was used in more than 55% of all ready mixed concrete placed in the USA. A subsequent survey (unpublished due to reduced response) validated that fly ash use has consistently increased over time. Due to sustainability and performance benefits the use of fly ash continues to grow. Fly ash is an industrial by-product produced due to coal burning in an electric power utility. Electric utilities are primarily focused on optimizing power generation and are not concerned with fly ash quality or variability. Fly ash properties may change depending on type and origin of coal used, blends of coal used, changes in the burner and other factors.

Back in the late 1980s the NSGA/NRMCA Joint Research Laboratory developed a draft Standard Practice for Evaluation of Uniformity of Fly Ash from a Single Source. The practice was used to conduct a detailed experimental study on 4 different fly ash sources – three ASTM C618 Class F fly ashes (F1, F2, F3) and one Class C (C1) fly ash. From each source 10 fly ash samples were procured per month, each on a different day, for 6 months, spread evenly throughout the period, for a total of 60 samples. The fly ash samples were procured from ready mixed concrete plants with each sample representing a different fly ash shipment. A large stock of cement was also procured and kept in sealed containers to maintain its properties during the course of the whole experimental program. The following tests were conducted on each fly ash sample:

1. Moisture content, Loss on Ignition (LOI), Fineness - percent passing the No. 325 sieve, Density, Water requirement, 7 day Strength Activity Index (SAI) – all tests according to ASTM C311
2. Uniformity of color compared to the previous shipment – see Appendix for details
3. Foam index test – see Appendix for details
4. Mortar air content and loss in air (modified C311) – see Appendix for details

Duplicate tests were run on three randomly selected fly ash samples from each group of 10. All the tests were conducted on the duplicate samples with the exception of uniformity of color. For the strength activity index one control reference cement mortar batch was cast for every 10 mortar batches cast with the fly ash samples. The same reference cement mortar strength was used for calculating the SAI of the 10 fly ash samples. Since cement from one shipment was being used for the reference cement mortar cubes the variation in cement mortar strengths provided an indication of the mortar testing variation. A statistical analysis of some of the experimental results is compiled in Tables 1a-d.

Air Entrainment

Tables 1a-d shows that the LOI varies several fold between shipments for each of the 4 fly ash sources. The mortar air content for a specific AEA dosage also varied between shipments for each of the sources. It varied the least for fly ash C1 (13.1% to 14.6%); it varied the most for fly ash F3 (11.1% to 18.4%) and varied moderately for Fly ash F1 (8.1% to 13.4%) and fly ash F2 (9.7% to 13.5%). So in terms of its effect on the ability to entrain air the different fly ash sources can be ranked in terms of more to less variable as follows: F3>F1>F2>C1.

Figures 1a-d shows that for fly ashes F1, F2, and F3 the loss in mortar air content increased as the initial mortar air content decreased thus suggesting that when the fly ash affected the mortar air content it is likely to lead to an increased loss in air content with time as well. As expected, fly ash C1 had the lowest loss in air content (up to 1%), fly ash F3 had the highest loss in air content (up to 6%) followed by F1 (up to 5%), and F2 (up to 3.5%).

Figures 2a-5a show the relation between LOI and mortar air content for samples of fly ashes F1, F2, F3, and C1, respectively. Figures 2b-5b show the relation between foam index and mortar air content for samples of the same fly ashes. Fly ashes C1 and F2 did not have good correlations between LOI vs. mortar air content and foam index vs. mortar air content. One possible reason could be that fly ash C1 and to a lesser extent
fly ash F2 had a very low variation in mortar air content between the different samples to begin with. Fly ash F3 had the best correlations whereas fly ash F1 had acceptable correlations for LOI and mortar air content. Fly ash F3 had the largest change in LOI content. It appears that LOI and foam index tests can be useful at estimating the effects on air entrainment only for fly ash sources that demonstrate a large variation in air entrainment.

The LOI and mortar air content results of samples of all 4 fly ash sources are plotted on Figure 6a. Similarly, the foam index and mortar air content results of samples of all 4 fly ash sources are plotted on Figure 6b. From the plots it is clear that a change in LOI or foam index will have a different effect on mortar air content for each source. So before one can use LOI or foam index values at estimating the effects on air entrainment it is important that a correlation be developed between the LOI or foam index and mortar air content for that fly ash source.

The relative color visual rating was plotted against the change in mortar air content between successive samples of each fly ash source. One would have expected the darker fly ashes to have increased reductions in mortar air content (assuming that increased carbon content could result in the darker color). Unfortunately no such correlations were found. Relative color does not appear to be a good way of estimating the effects of the fly ash sample on air entrainment. At best it may indicate something has changed from the previous shipment.

Figures 7a-d shows the relation between relative density (RD), also referred as specific gravity, and mortar air content for fly ashes F1, F2, F3, and C1 respectively. Fly ashes C1 and F2 did not have good correlations between RD and mortar air content while Fly F3, and F1 had better correlations. The lower RD is likely due to increase in carbon content and hence leads to lower air content.

As expected, moisture content had no correlation with mortar air content for any of the fly ashes. Fineness had an average correlation with mortar air content for fly ash F3.

Strength Activity

Fly ash mortar strengths generally varied over a wider range as compared to companion control mortar strengths with the reference portland cement. The Coefficient of Variations (COVs) of the fly ash mortar strengths were about 4% for fly ash sources F1, F2 and F3. The corresponding COVs of the control mortar strengths of the reference cement was only about 1% with the exception of the control mortar strength tested for fly ash F2 which was inexplicably higher. The COV of the fly ash mortar strengths for source C1 was also much lower at 1.4%. This suggests that the variation in strength for fly ash sample C1 was largely due to testing whereas fly ash F1, F2, F3 had a statistically significant mortar strength variation, greater than that attributed to testing variation.

The range (difference between the maximum and minimum strength attained by samples from a given fly ash source) of the 7 day fly ash mortar strengths was about 700 psi for fly ash sources F1, F2 and F3 and 243 psi for fly ash C1. The average range of the 7 day fly ash mortar strength of the three fly ash sources F1, F2 and F3 was 682 psi. Concrete testing was not conducted in this study but of interest would be how this range of mortar strengths would translate to concrete strengths. In an earlier article8 it was shown that for the same cement source, strengths of mortar cubes tested according to ASTM C1099 correlated well with strengths of concrete cylinders tested according to ASTM C39°. An average 1379 psi range in C109 mortar strength (w/c = 0.485) between the cement samples corresponded to an average 820 psi range in concrete strength (w/c = 0.58) for the same samples. If a similar correlation is expected an average range in 7 day fly ash mortar strengths of 682 psi can correspond to an average range in concrete strength of 400 psi as long as the same cement is used for both the mortar mixtures and the concrete mixtures.

Moisture content, LOI, specific gravity and color had no correlation with any of the fly ashes. Fineness had an average correlation with strength attained by samples from a given fly ash source) of the 7 day concrete strengths. In an earlier article8 it was shown that for the same cement source, strengths of mortar cubes tested according to ASTM C1099 correlated well with strengths of concrete cylinders tested according to ASTM C39°. An average 1379 psi range in C109 mortar strength (w/c = 0.485) between the cement samples corresponded to an average 820 psi range in concrete strength (w/c = 0.58) for the same samples. If a similar correlation is expected an average range in 7 day fly ash mortar strengths of 682 psi can correspond to an average range in concrete strength of 400 psi as long as the same cement is used for both the mortar mixtures and the concrete mixtures.

Fly Ash Testing Required by ASTM C618 and C311

Table 1 in ASTM C311 provides the minimum sampling and testing frequency for the fly ash. For established fly ash sources moisture content, LOI, and fineness tests need to be conducted at a frequency of the smaller of daily or every 400 tons; Density, SAI and various other chemical tests listed in ASTM C6184 are to be conducted on composite samples monthly or every 3200 tons whichever comes first. Composite samples do not reflect the true variation that is likely from fly ash shipments. The same composite sample test result may be applicable to many different fly ash shipments to the same concrete plant. To comply with C618 the fly ash marketer conducts LOI and fineness testing 1-3 times a day depending on the daily production at the fly ash source.

ASTM C618 also has a uniformity requirement for density and fineness. It states that the density and fineness of individual samples shall not vary from the average established by the 10 preceding tests, or by all preceding tests if the number is less than 10, by more than 5% (for density) and 5% retained on No. 325 sieve (for fineness).

Suggested Producer Actions - Air Entrainment

Concrete air entrainment is perhaps the most important factor that is affected by fly ash. The concrete producer should make it a point to receive LOI and fineness test results on the same day the shipment had left the fly ash source. Sometimes the test results may be available only at the end of the day after the fly ash shipment had left for the concrete plant. It is worthwhile for the concrete producer to develop an understanding with the fly ash marketer to receive those results.

If the LOI test result varies from the previous fly ash shipment that by itself is of little value. It is suggested that fly ash marketers develop a correlation between LOI and mortar air content for that fly ash source. If there is no correlation between LOI and mortar air content then the fly ash marketer can develop a correlation between foam index and mortar air content for that fly ash source. If there is no correlation between foam index and mortar air content as well then the fly ash marketer could conduct mortar air testing every time the LOI test is conducted at the fly ash source. This systematic approach provides the concrete producer some understanding of the effect of the fly ash shipment on air entrainment before the fly ash is used in concrete.
The concrete producer could also conduct the foam index or the mortar air content test at the concrete plant when a fly ash shipment is received. These tests can be completed in less than 15 minutes by operators without any significant training. If the mortar air content attained is for example 50% less than that achieved for the previous fly ash shipment the decision can be made to increase the AEA dosage in the concrete made with the new fly ash shipment by at least 50%. The first few concrete trucks that use the fly ash from the new shipment should be tested for air content in accordance with ASTM C231. Depending on those concrete test results AEA admixture dosages for future truck loads could be adjusted. The concrete producer could skip the foam index or mortar air test and conduct concrete air content testing while maintaining the same AEA dosage as for the previous fly ash shipment. This approach may take a little longer to clearly identify the effect of the new fly ash shipment on air entrainment because there are many other factors involved in batching and measuring air content from a concrete truck.

RD of fly ash could also be an indicator for the effect of the fly ash on air entrainment. However, RD is conducted on composite fly ash samples and therefore the data is attained less frequently and as discussed earlier may not be representative of the shipment received. The concrete producer should check to ensure that the fly ash meets the uniformity requirements for density. It is also important to use the correct RD for the fly ash in the mixture proportions.

In the study discussed earlier color did not prove to be a good indicator for air entrainment. It would be useful to conduct the color test using handheld colorimeters that are available nowadays. These are less subjective and it would be of interest to see if a correlation can be developed between the results of the colorimeter test and the mortar air content.

**Suggested Producer Actions - Strength Activity**

The results of the study discussed earlier suggested that different fly ash shipments from a given source can contribute to a variation in concrete strength. A concrete producer interested in reducing this strength variation can attempt to adjust the concrete mixture proportions based on the expected strength variation due to fly ash. The producer should pay close attention to the fineness and SAI values. The first thing is to ensure that the C618 uniformity requirements for fineness are met. The producer can develop a control chart of fineness test results for the shipments received at the concrete plant and adjust mixture proportions if certain control chart limits are exceeded. It is suggested that the control chart limits be set at 5% above and below the average fineness value. When the higher fineness limit is exceeded (i.e. there is a higher percent retained) it means that strengths can be lower as the fly ash has coarser particles. It is suggested that for every increase in fineness value of 5% the compressive strength of concrete be increased by 150 psi through the use of a lower w/cm.

SAI could also be an indicator for variation in concrete strength but the SAI test results suffer from several disadvantages: 1. SAI tests are conducted on composite samples; 2. 7 day SAI values are likely to be available many days after the fly ash shipment has been received at the concrete plant; 3. SAI is conducted by the fly ash marketer using its reference cement. Fly ash interaction with the cement used by the producer may be different in which case the variation in SAI test results may not necessarily correlate with the variation in compressive strength of concrete produced at the plant. Nevertheless it is useful to plot both the 7 and 28 day SAI values as soon they are obtained. Concrete producers can use it to troubleshoot low concrete strengths in evaluating whether the cause for the low concrete strength can be attributed to a reduction of the SAI. Other factors, such as mixing water, air content, batching errors, testing errors etc., should also be considered.

**Other Tests**

Thermal measurements of hydrating concrete mixtures is another tool at the disposal of the concrete producer. Essentially, this test involves casting a mortar or a concrete cylinder and measuring its temperature rise in an insulated environment over a 24 hour period. The temperature profile can provide indications of concrete setting time, early age strength development and potential interaction problems between cementitious materials and admixtures. Significant variations in temperature profile can indicate potential variation in the above properties. When these tests are done periodically at the concrete plant they can provide a means to study the overall variations due to shipments of cement, fly ash/slag and chemical admixtures. Once a change in the overall behavior has been identified individual material shipments could be tested to identify the root cause of the change.

**Summary of Suggested Producer Actions**

Develop an understanding with the fly ash marketer so that all the LOI, fineness, foam index and mortar air content (if available) test results conducted on the same day the fly ash shipment left the plant are attained.

Encourage fly ash marketers to develop a correlation between LOI and mortar air content or LOI and foam index for that fly ash source. If there is no such correlation encourage fly ash marketer to conduct mortar air testing every time the LOI test is conducted at the fly ash source. This systematic approach provides the concrete producer with some understanding of the effect of the fly ash shipment on air entrainment before its use in concrete.

Develop company policy on adjusting AEA dosage based on foam index or mortar air content test results using the new fly ash shipment.

At a minimum test the first few concrete trucks that use the fly ash from the new shipment for air content in accordance with ASTM C231 and adjust AEA dosage accordingly.

Check to ensure that the fly ash is meeting the uniformity requirements for density and fineness. Use the correct RD for the fly ash in concrete mixture proportions.

Develop a control chart of fineness test results for the shipments received at the concrete plant. Develop company policy to adjust concrete mixture proportions if certain control chart limits are exceeded.

Plot the 7 and 28 day SAI values as soon they are obtained. Use it to troubleshoot low concrete strengths in evaluating whether the cause for the low concrete strength can be attributed to a reduction of the SAI. Consider other factors, such as mixing water, air content, batching errors, testing errors etc. Retain 5-lb samples of fly ash from each shipment for 3 to 6 months in sealed containers so that these...
can be tested at a later point if necessary. Sampling procedure are described in ASTM C311.

If possible conduct thermal measurements of hydrating concrete mixtures and look for significant variations in temperature profile.

References
2 Obla, K.H., “Sources of Concrete Strength Variation – Part II of Concrete Quality Series”, Concrete InFocus, July-August 2010, Vol. 9, No. 4, NRMCA, pp. 21-23.
8 Obla, K.H., “Variation in Concrete Strength Due to Cement”, Concrete InFocus, Nov-Dec 2010, Vol. 9, No. 6, NRMCA, pp. 8-12.

Appendix

Uniformity of Color

An approximately 1 in. thick layer of fly ash shall be carefully placed on the top of the previous sample of ash in a 1000 ml hydrometer jar (ASTM D422). Rate the color of the current sample in comparison to the immediately preceding sample according to Table A1.

Table A1: Visual Estimator of Fly Ash Color Uniformity

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>Much lighter, a color difference clearly detected</td>
</tr>
<tr>
<td>-1</td>
<td>Slightly lighter, color difference detectable by most observers</td>
</tr>
<tr>
<td>0</td>
<td>Same, no color difference by at least half of a group of 4 observers</td>
</tr>
<tr>
<td>+1</td>
<td>Slightly darker, color difference detectable by most observers</td>
</tr>
<tr>
<td>+2</td>
<td>Much darker, a color difference clearly detected</td>
</tr>
</tbody>
</table>

Foam Index Test

The foam index test measures rapidly the effect of a fly ash sample on the required air-entraining admixture dosage to obtain the required entrained air content in concrete, and will help detect a change in fly ash properties from previous shipments. The foam index test has not been standardized by ASTM. The procedure described here has been used at NRMCA since later 1970s. Place 16 grams cement + 4 grams fly ash in a wide mouth glass bottle. Add 50 mL water, cap bottle and shake for 1 minute. Add air-entraining agent (diluted 1:20 with water) in measured increments using an accurate pipette. After each addition, cap and shake vigorously for 15 seconds. Remove cap and observe the stability of the foam. The amount of diluted air-entraining agent needed to produce a stable foam that just covers the surface is the foam index of the fly ash. The foam index test can also be run on 20 grams of cement alone to understand the influence of cement shipment. The foam index test might also be run with 40 grams of sand to understand the influence of sand shipments.

Mortar Air Content and Air Loss (Modified C311)

ASTM C311 suggests using air entraining admixture (AEA) dosage to target mortar air content of 18%. Research had indicated that to attain 18% mortar air content an excessive amount of AEA dosage was required which was ineffective in evaluating the effect fly ash will have on air entrainment. Therefore AEA dosage to target mortar air content around 12% was used. The AEA is added to the mixing bowl while the sand is being introduced. The rest of the steps are similar to that recommended in C311.

The loss of mortar air was measured as follows. Immediately after weighing the 400-ml measure (for gravimetric mortar air content measurement) the mortar, including the mortar used for flow determination, is returned to the mixing bowl. The bowl is covered to prevent evaporation. After a 45 minute rest period (from the time of mixing) the bowl is uncovered and remixed at medium speed for 5 minutes. The target flow of 80 to 95 is attained with some water adjustments after which the mortar air content is measured again gravimetrically by weighing the mortar filled 400-ml measure.
### Table 1a Data Analysis of Results of Fly Ash source F1

<table>
<thead>
<tr>
<th>Mortar Air, %</th>
<th>Final Mortar Air, %</th>
<th>LOI %</th>
<th>Foam Index, oz/cwt.</th>
<th>RD</th>
<th>7d Fly ash Strength, psi</th>
<th>7d SAI, %</th>
<th>7d Control Strength, psi</th>
<th>% Retained No. 325</th>
<th>Water demand, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>10.8</td>
<td>8.9</td>
<td>1.2</td>
<td>2.01</td>
<td>2.166</td>
<td>3773</td>
<td>80.1</td>
<td>4711</td>
<td>26.5</td>
</tr>
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<td>Standard Deviation</td>
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<td>3.5</td>
<td>0.5</td>
<td>0.29</td>
<td>0.12</td>
<td>151</td>
<td>3.7</td>
<td>52</td>
<td>5.2</td>
</tr>
<tr>
<td>Coef., of Variation, %</td>
<td>15.3</td>
<td>39.1</td>
<td>43.7</td>
<td>4.1</td>
<td>6.6</td>
<td>4.6</td>
<td>1.1</td>
<td>19.8</td>
<td>1.5</td>
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<tr>
<td>Maximum</td>
<td>13.4</td>
<td>13.9</td>
<td>2.1</td>
<td>2.40</td>
<td>2.44</td>
<td>4064</td>
<td>88.0</td>
<td>4791</td>
<td>38.3</td>
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<tr>
<td>Minimum</td>
<td>8.1</td>
<td>3.6</td>
<td>0.3</td>
<td>1.35</td>
<td>1.92</td>
<td>3354</td>
<td>70.0</td>
<td>4618</td>
<td>19.3</td>
</tr>
</tbody>
</table>

*Final mortar air as measured after 45 minutes (40 minutes of rest followed by 5 minutes of mixing)*

### Table 1b Data Analysis of Results of Fly Ash source F2

<table>
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<tr>
<th>Mortar Air, %</th>
<th>Final Mortar Air*, %</th>
<th>LOI %</th>
<th>Foam Index, oz/cwt.</th>
<th>RD</th>
<th>7d Fly ash Strength, psi</th>
<th>7d SAI, %</th>
<th>7d Control Strength, psi</th>
<th>% Retained No. 325</th>
<th>Water demand, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>11.8</td>
<td>10.5</td>
<td>2.0</td>
<td>1.58</td>
<td>2.17</td>
<td>3516</td>
<td>77.5</td>
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<td>23.9</td>
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<td>Standard Deviation</td>
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<td>1.9</td>
<td>0.5</td>
<td>0.17</td>
<td>0.04</td>
<td>137</td>
<td>2.8</td>
<td>184</td>
<td>3.0</td>
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<tr>
<td>Coef., of Variation, %</td>
<td>8.0</td>
<td>18.1</td>
<td>25.4%</td>
<td>10.9</td>
<td>1.8</td>
<td>3.9</td>
<td>3.7</td>
<td>4.1</td>
<td>12.5%</td>
</tr>
<tr>
<td>Maximum</td>
<td>13.5</td>
<td>13.0</td>
<td>3.1</td>
<td>1.92</td>
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<td>3820</td>
<td>82.0</td>
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<tr>
<td>Minimum</td>
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<td>0.7</td>
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<td>2.06</td>
<td>3214</td>
<td>68.0</td>
<td>4287</td>
<td>16.8</td>
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*Final mortar air as measured after 45 minutes (40 minutes of rest followed by 5 minutes of mixing)*

### Table 1c Data Analysis of Results of Fly Ash source F3

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<tr>
<th>Mortar Air, %</th>
<th>Final Mortar Air, %</th>
<th>LOI %</th>
<th>Foam Index, oz/cwt.</th>
<th>RD</th>
<th>7d Fly ash Strength, psi</th>
<th>7d SAI, %</th>
<th>7d Control Strength, psi</th>
<th>% Retained No. 325</th>
<th>Water demand, %</th>
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<tr>
<td>Average</td>
<td>14.5</td>
<td>10.8</td>
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<td>0.91</td>
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<td>Coef., of Variation, %</td>
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<td>33.7</td>
<td>26.3%</td>
<td>24.3</td>
<td>2.3</td>
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<td>4.0</td>
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*Final mortar air as measured after 45 minutes (40 minutes of rest followed by 5 minutes of mixing)*

### Table 1d Data Analysis of Results of Fly Ash source C1

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<th>Mortar Air, %</th>
<th>Final Mortar Air, %</th>
<th>LOI %</th>
<th>Foam Index, oz/cwt.</th>
<th>RD</th>
<th>7d Fly ash Strength, psi</th>
<th>7d SAI, %</th>
<th>7d Control Strength, psi</th>
<th>% Retained No. 325</th>
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<tr>
<td>Average</td>
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<td>14.2</td>
<td>0.5</td>
<td>1.18</td>
<td>2.66</td>
<td>4393</td>
<td>96.0</td>
<td>4577</td>
<td>18.1</td>
</tr>
<tr>
<td>Standard Deviation</td>
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<td>0.6</td>
<td>0.2</td>
<td>0.10</td>
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<td>62</td>
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<td>Coef., of Variation, %</td>
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<td>4.5</td>
<td>33.6%</td>
<td>8.9</td>
<td>1.3</td>
<td>1.4</td>
<td>1.7</td>
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<td>5.1%</td>
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<td>1.54</td>
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</tbody>
</table>

*Final mortar air as measured after 45 minutes (40 minutes of rest followed by 5 minutes of mixing)*
FIGURE 1. Increased Air Loss with Reduced Mortar Air Content for a Fixed AEA Dosage (a) Fly ash F1; (b) Fly ash F2; (c) Fly ash F3; and (d) Fly ash C1

FIGURE 2. Effect on Fly ash F1 Mortar Air Content at a Fixed AEA Dosage due to (a) LOI; and (b) Foam Index

FIGURE 3. Effect on Fly ash F2 Mortar Air Content at a Fixed AEA Dosage due to (a) LOI; and (b) Foam Index

FIGURE 4. Effect on Fly ash F3 Mortar Air Content at a Fixed AEA Dosage due to (a) LOI; and (b) Foam Index

FIGURE 5. Effect on Fly ash C1 Mortar Air Content at a Fixed AEA Dosage due to (a) LOI; and (b) Foam Index

FIGURE 6. Effect on Fly ash (all) Mortar Air Content at a Fixed AEA Dosage due to (a) LOI; and (b) Foam Index. All 4 fly ashes are plotted on each of the above plots.

FIGURE 7. Effect on Fly ash Mortar Air Content at a Fixed AEA Dosage due to RD (a) Fly ash F1; (b) Fly ash F2; (c) Fly ash F3; and (d) Fly ash C1
Can an employee decide when he or she wants the starting date to be established for a potential leave of absence covered by the US Family Medical Leave Act (FMLA)? What if he or she decides he or she doesn’t want an FMLA?

Let’s lay a bit of ground work first. The Family Medical Leave Act of 1993 (FMLA) is a federal law that provides certain employees with serious health problems, or those who need to care for a child or other family member, with up to 12 weeks of unpaid, job-protected leave per year. It also requires that group health benefits be maintained. For an individual to qualify for FMLA, an employee must be employed by a business with 50 or more employees within a 75 mile radius of his/her work site. The employee must have worked for the employer for at least 12 months and 1,250 hours within the last 12 months.

Assuming you meet the criteria above to qualify for FMLA, the start date of an approved FMLA is critical because it establishes the 12 month period during which an employee is entitled to 12 weeks of unpaid leave for a qualifying event. If the employer has information or knowledge of an event that could possibly qualify for FMLA (birth/adoption/foster child placement, employee’s own serious health condition, care for the serious health condition for a spouse, child or parent, certain military exigency leave situations), then the employer is required to give notice to the employee and ask for additional information. If this notice is properly given, then the employer can designate the start of any approved FMLA leave based on the documentation provided (health care provider or other appropriate documentation). The employee has the responsibility to give as much advance notice as possible in situations that are planned (like the birth/adoption of a child, scheduled medical procedures that qualify, etc…). As a result, the employee cannot arbitrarily determine the start date of a leave that qualifies for FMLA. This will be determined by the supporting documentation.

In addition, an employee who refuses to provide information because he or she does not want to utilize FMLA is not required to do so. The prudent course for an employer is to treat a potentially qualifying event as if it were an approved FMLA in place. There should be documentation of the distribution of the required forms and notification as well as the employee’s refusal to provide any supporting documentation. In addition, the employee should be given the 12 weeks of unpaid leave during the 12 month period that would be recognized as the FMLA period. Taking this approach will more likely serve the employer well if there is a subsequent issue or termination because of absences.

If you’re unfamiliar with Family Medical Leave Act (FMLA), you should check the Department of Labor Web site for a fact sheet on the Act. You will find valuable information regarding employer and employee responsibilities as well as the required notification forms for potential events covered by the Act.

If you have a specific question regarding the administration of FMLA or a concern regarding a specific situation, you should consult with your HR professional and/or seek legal counsel.

FIGURE 8. Effect on Fly ash SAI due to Fineness (No. 325 sieve percent retained) (a) Fly ash F1; (b) Fly ash F2; (c) Fly ash F3; and (d) Fly ash C1.