



FLSMIDTH
CEMENT

KILN ALIGNMENTS

HOT ALIGNMENT DURING OPERATION

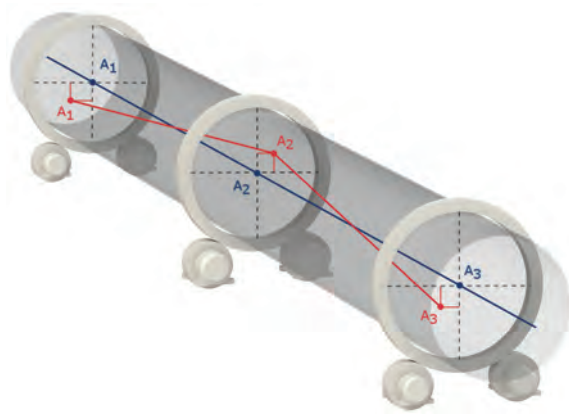
With more than 180 hot kiln alignments per year, FLSmidth Cement has a unique ability to support customers worldwide. FLSmidth Cement's hot kiln alignments ensure that your kiln keeps operating at maximum efficiency throughout its entire service life. An alignment helps you avoid any unforeseen breakdowns and maintain full kiln availability and productivity – resulting in optimum kiln performance and maximum production.

FLSmidth Cement's kiln alignment is part of a preventative maintenance strategy that identifies the actual cause behind problems and recommends a more

efficient solution. A kiln alignment also helps diagnose potential causes of failure before problems occur.

Typically, a comprehensive kiln alignment investment is paid back simply by avoiding one unplanned stop because an unexpected kiln stop is very costly.

Our alignment methods are based on advanced measuring techniques and customised hardware and software. The alignment is evaluated by experienced alignment specialists and carried out during normal operation of the kiln, so production is uninterrupted.



KEY BENEFITS

**Higher availability
and longer kiln life**

**Flexible on-site
troubleshooting**

**Alignment carried
out during normal
kiln operation**

**Spare-parts
planning advice**

**Short pay-back
time due to fewer
unforeseen stoppages**

**Knowledge-sharing with
maintenance staff
during alignment**

KILN ALIGNMENT APPROACH

As a part of a preventative maintenance strategy, periodic kiln alignment identifies problems before a failure or breakdown. Instead of simply treating the symptoms, we identify and treat the actual root causes. If only symptoms are treated they are likely to recur and cause further damage.

It is FLSmidth Cement's experience that the majority of all failures are caused by four root causes:

- Kiln axis
- Kiln shell ovality/shell flex
- Kiln crank
- Kiln axial balance

Besides evaluating the root causes of symptoms, the following are also considered during a comprehensive hot kiln alignment:

- Kiln drive evaluation
- Visual mechanical inspection
- Engineering study



SYMPTOM ROOT CAUSE	HOT BEARINGS		CRACKS		WEAR		LINING DAMAGE	
	on bearing journal	on thrust collar	in kiln shell	in support roller shaft	on supporting roller and tyre	between tyre and kiln shell	between the supports	under the tyre
Kiln axis	•		•	•	•			•
Kiln ovality/shell flex			•			•		•
Kiln crank	•		•	•			•	
Kiln axial balance		•			•			

SERVICE TYPES

Standard kiln services

	Kiln axis	Kiln shell ovality/ shell flex	Kiln crank	Kiln axial balance	Kiln drive	Visual inspection	Engineering study	Supervision of adjustment (optional)
Comprehensive hot kiln alignment	•	•	•	•	•	•	•	•
Hot kiln alignment	•	•	•	•	•	•		•
Kiln axis measurement	•	•						•
Rotax-2® hot kiln inspection				•	•	•		•

Related kiln services

Non-destructive testing of supporting rollers

Using non-destructive testing, we can detect cracks on the supporting roller and tyre surface during a kiln stop. When the kiln is running, we can detect cracks in the supporting roller shaft. These findings help with preventative maintenance and any problems can be corrected before failure occurs.

Training session

In addition, we also offer theoretical combined with on-site training in kiln alignment or adjustment and evaluation of axial balance.



ADDED VALUE

Crucial spare-parts planning

By having a better understanding of your need for crucial parts, based on your actual kiln condition, you can improve your spare-parts planning.

A kiln alignment will help identify the parts you should keep in stock and will therefore reduce your material asset budget.

Increasing maintenance staff's technical competence

Knowledge sharing between FLSmidth Cement alignment specialists and your technical staff is vital. When we are diagnosing a kiln, we value your input and will work together with maintenance staff to achieve the best results. Often this dialogue will help increase your technical staff's competency levels in kiln maintenance.

Flexibility

We can fine-tune the alignment and trouble-shoot problems on-site, ensuring the kiln alignment meets your exact needs.



Measuring methods

- The high resolution SFX Ovality Beam provides the data necessary to accurately determine the kiln ovality. This helps explain mechanical refractory failure and gives a more complete picture of kiln alignment characteristics.
- The in-house developed One-Theodolite-Solution enables us to measure the kiln axis in a quick and flexible way. This method eliminates potential physical obstacles and ensures that the kiln axis is measured with high accuracy and reliability.

FINAL MEETING AND REPORTING

Before we leave your site, we will arrange a final meeting and present a report that includes:

- findings
- measurements
- major conclusions
- recommendations

This will document and serve as a basis for planning your next maintenance stop well in advance, and will help to create a maintenance schedule with minimum downtime.

The purpose of this meeting is also to answer any remaining questions and to enable you to take immediate action. If required, we're available to stay and supervise the recommended adjustment.

An FLSmidth Cement kiln alignment not only provides you with measurements and data, but also gives you a general evaluation of the kiln system including specific conclusions and actual action to take



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