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Estimation method of tube metal temperature exposed to high temperature flue gas in large scale coal fired boilers

* 1, # 2
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Key words : Boiler, Tube Metal Temperature, Heat Flux

1.

RPC(Rankin Power Cycle)
 (heat exchanger)

(slagging)

(fouling)

Metal 가 가
 Metal Temp.

Assembly(13 Elements) Assembly 05-Row 01,05 Assembly 07-Row 01, Assembly 08-Row 05, Assembly 25-Row 01, Assembly 37-Row 01 12
 , Assembly 08-Row 05 Redundancy 2
 가 2

3. 2

(Mid-wall Metal Temp.)

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2.

Mid-wall Temperature

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(Spot Welding)

Mid-wall Temp.

Mid-wall Temp.가

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Mid-wall Temp.

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(Radiation)

Metal Temp.

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Mid-wall Temp.

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3.

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3. 3

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2

Tube Mid-wall

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Table 1 Measured & Design Metal Temp.

Assembly #05-01			
	T/C Location	Measured T()*	Design T()
Measured Location	Stub Tube	590	584
	Upper "A"	592	609
	Lower "B"	571	582
Assembly #05-05			
Measured Location	Stub Tube	589	589
	Upper "A"	591	611
	Lower "B"	574	588

3. 1

Metal Temp.

Metal Temp.가 가
 Penthouse

Metal Temp.가

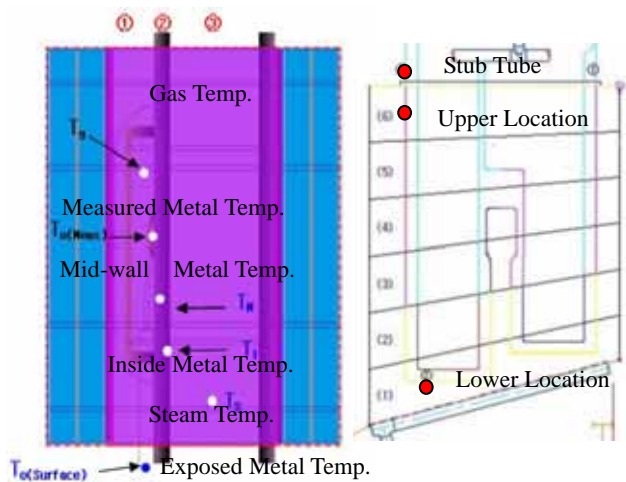
Metal Temp.

Assembly #07-01			
Measured Location	Stub Tube	598	584
	Upper "A"	602	609
	Lower "B"	578	582
Assembly #08-05			
Measured Location	Stub Tube	593	589
	Upper "A"	595(624)	611
	Lower "B"	578(628)	588
Assembly #25-01			
Measured Location	Stub Tube	577	584
	Upper "A"	582	609
	Lower "B"		582
Assembly #37-01			
Measured Location	Stub Tube		584
	Upper "A"	579	609
	Lower "B"	564	582

* : Before Estimation

1) 가, :

T_g T_o (Measured) T_1, T_s
 Assembly 가 50 ~
 가 가 (Mid-wall Temp. Cal)



(a) Temp for Cal. (b) Temp. Measured Location

Fig. 1 Tube inside steam temperature cal. & measured points

4.

Tube Mid-wall Temp.

Metal Temp.

Mid-wall Temp.

Table 2 Tube 08_05 05_01 Mid-wall Temp.

< " " : : Tube 08_05 >
 : 575.3
 -- : 2.16, : 3
 < " " : Material Change : Tube 08_05 >
 () : 583.15 , () : 3.25

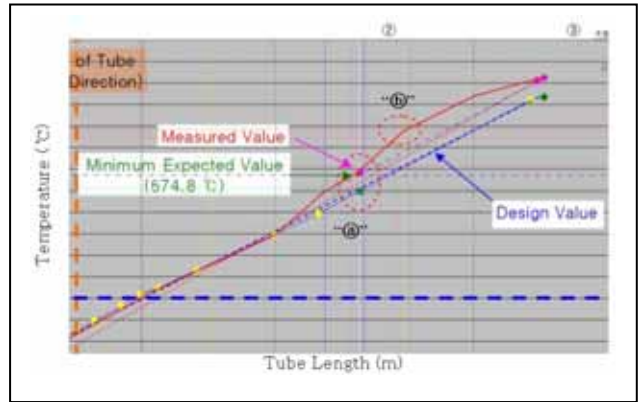


Fig. 2 Design and measured steam temp. trend (08_05)

Table 2 Tube 08_05 and 05_01 Data Summary

Assembly 08_ Row 05					
" " Location :					
" " Location : Material Change					
Ref.	Loc.	(T _{SM})	(T _{SC})	(T _M)	(T _O)
		578	575	593	600
		578	575	596	604
			583	601	608
			583	606	614
Assembly 05_ Row 01					
		571	569	589	594
		578	575	592	600
			577	594	600
			583	605	615

5.

Tube Mid-wall Temp.

1)

1~5

2)

3) Element

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