Chapter V

Conclusion

5.1 Conclusion

From the results of the calculation of temperature and thermal stress that has been done, it can be concluded:

1. The higher the temperature of the gas flowing inside the kiln, the greater the temperature of the hot spot produced and the temperature distribution on the outside of the kiln skin becomes uneven due to this hot spot. The temperature difference on the inside and outside of the hot spot has decreased linearly. At the gas temperature of 600^{o}C, 1000^{o}C and 1400^{o}C the hot spot temperature is 385^{o}C, 752^{o}C and 1164^{o}C respectively. Temperature differences between the circumference of the kiln and the hot spot when the gas temperature is 600^{o}C is 175^{o}C, when 1000^{o}C is 480^{o}C and when 1400^{o}C is 830^{o}C
2. The thermal stress is getting higher when the temperature of the hot spot is also higher. At the gas temperature of 600^{o}C, 1000^{o}C and 1400^{o}C the hot spot thermal stress is 170 MPa, 405 MPa and 713 MPa respectively. The difference in thermal stress between the circumference and the hot spot area when the gas is 600^{o}C is 164 MPa, when 1000^{o}C is 395 MPa and when 1400^{o}C is 698 MPa.
3. From the three gas temperature variations that have been carried out, only at the gas temperature of 600^{o}C that does not pass its yield stress. When the

gas temperature is 1000^{o}C and 1400^{o}C, the thermal stress passes through the yield stress, at the worst condition of gas temperature of 1400^{o}C the stress is beyond its tensile stress which can affect the kiln damage. From the result the safest condition is at gas temperature of 600^{o}C, because there is none of the area passes through the yield stress.