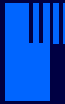


SUOMEN SOODAKATTILAYHDISTYS  
FINNISH RECOVERY BOILER COMMITTEE

# Finnish Recovery Boiler Committee

Markus Nieminen

Inspecta SKOG  
Sundsvall, March 22-23, 2012



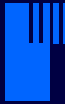
# Content

- Overview to recovery boiler committee
- Overview to finnish recovery boilers
- Incident statistics in Finland
- Incidents in Finland 2011



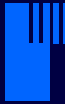
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# Overview to Finnish recovery boiler committee



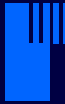
# Introduction

- The Finnish Recovery Boiler Committee (FRBC) has promoted safe, economic and environmentally friendly operation of recovery boilers and closely related processes since 1964.
- The Committee collects information about incidents involving recovery boilers and provides details of these to its members. The Committee publishes guidelines, recommends practices and arranges conferences and meetings. The Committee conducts and supports research projects related to safe operation and improved economy of recovery boilers.



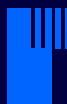
# Members

- The members of the Committee include pulp mills, recovery boiler manufacturers, a number of insurance companies and automation system suppliers, engineering companies and research organisations in Finland.
- Total 27 members, including 15 pulp mills
- There is a yearly member fee

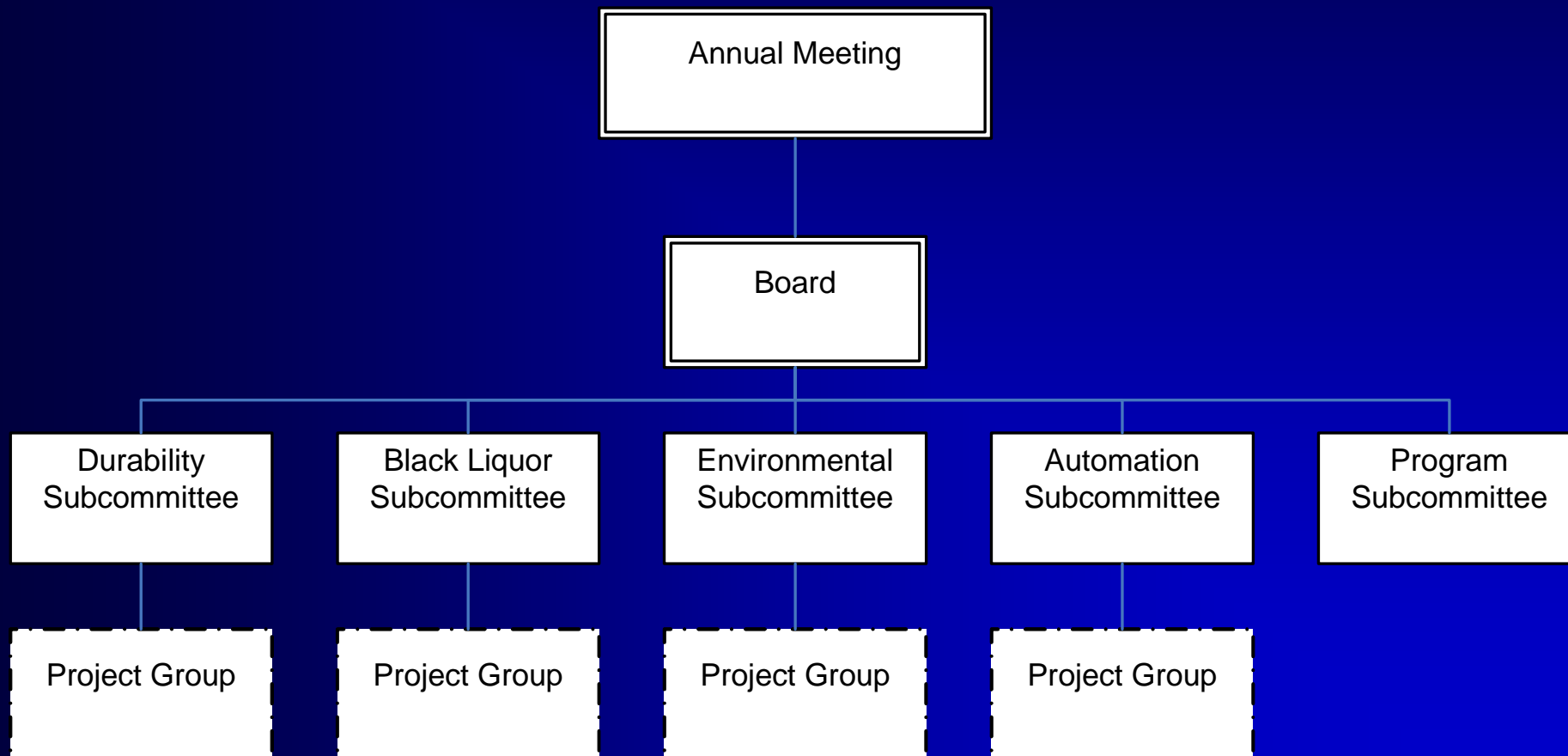


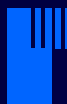
# Decision making

- The highest decision-making body of the FRBC is the Annual General Meeting which appoints the Executive Board every year in April.
- The Executive Board controls the budget and supervises sub-committees projects
- There are five sub-committees
  - the Material Sub-committee
  - the Black Liquor Sub-committee
  - the Environmental Sub-committee
  - the Automation Sub-committee
  - the Program Sub-committee



# Organisation





# FRBC 50 years and ICRC 2014

- In 2014, FRBC celebrates its 50th anniversary
- International Chemical Recovery Conference (ICRC) will be held between 9.6. – 12.6.2014 in Tampere Hall

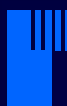




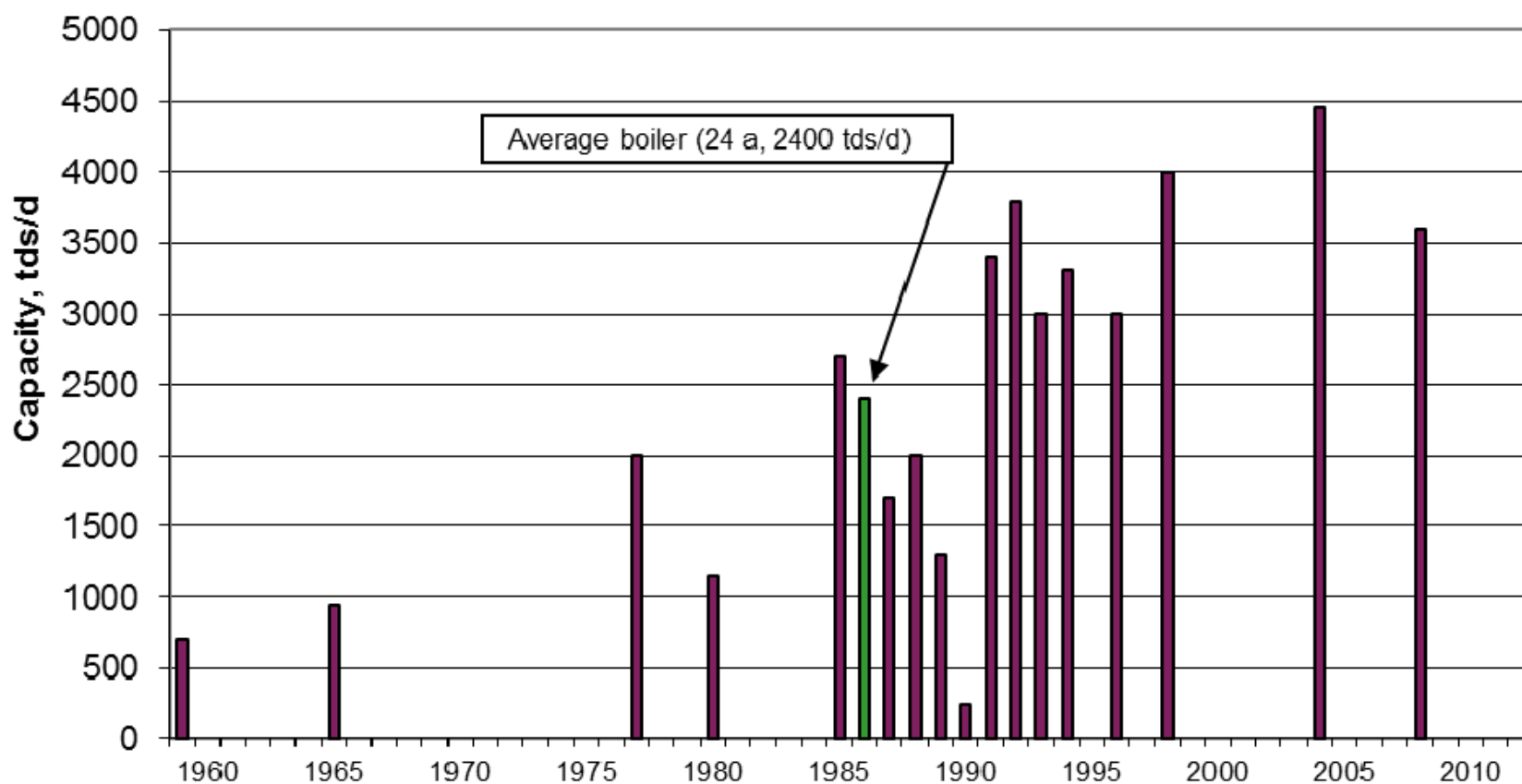


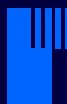
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# Overview to finnish recovery boilers



# Finnish Recovery Boilers





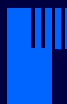
# Finnish recovery boilers

- No. of recovery boilers 17
- Number of mills 15
- Average boiler age 24 yrs
- Capacity weighted age 19 yrs
- Average boiler size 2400 t ds/d
  - 2 mills operate more than one RB

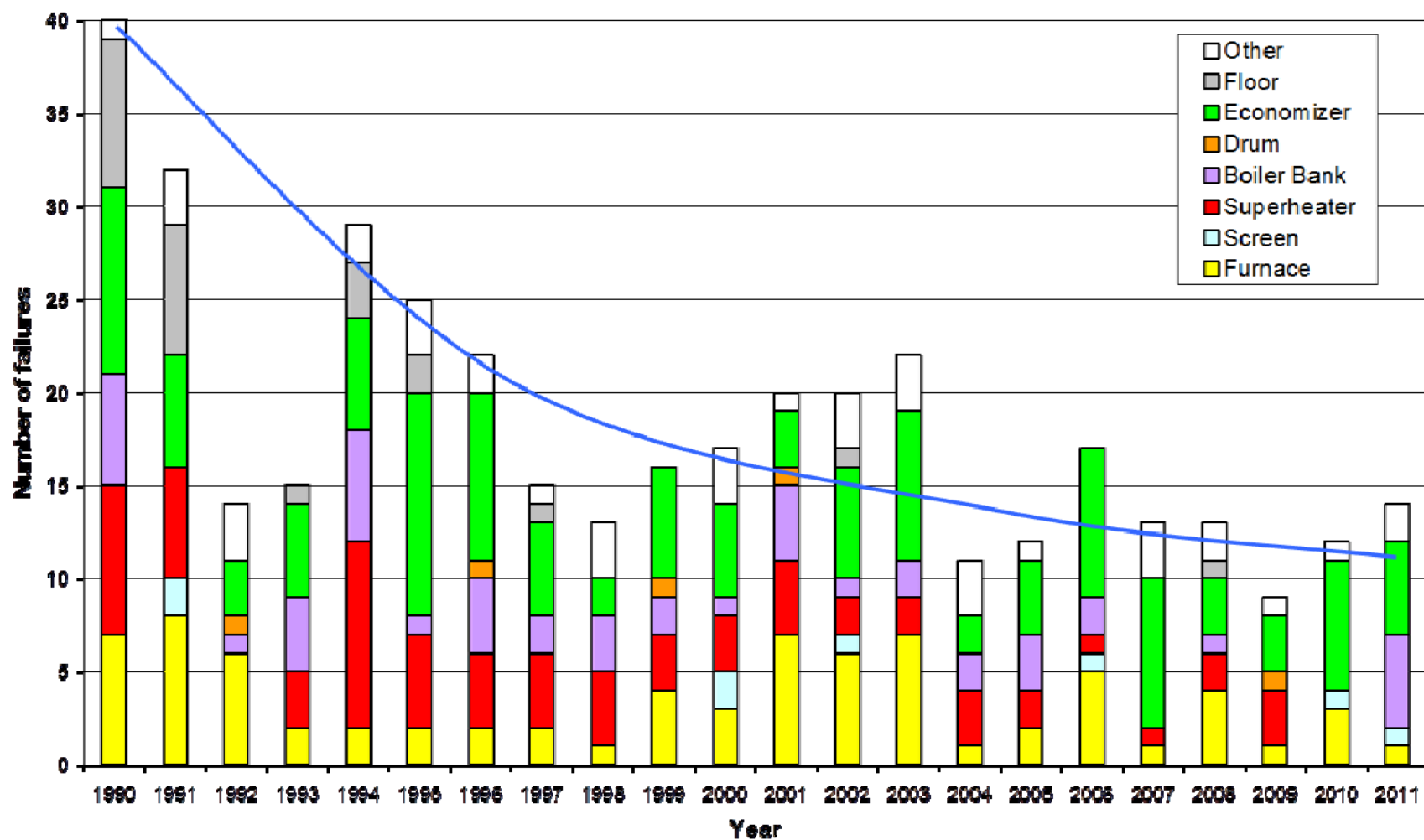


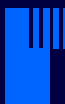
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# Incidents statictics

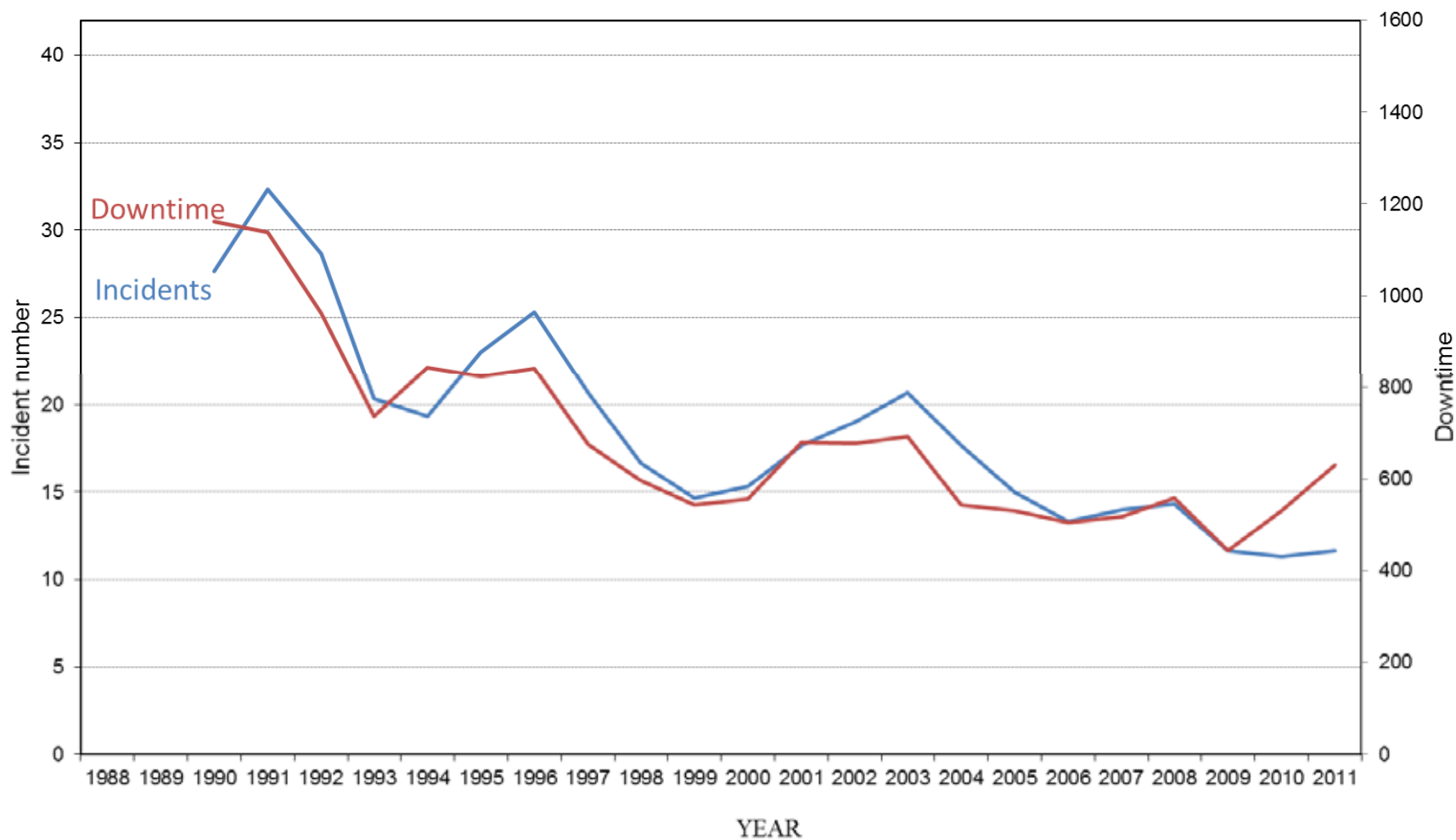


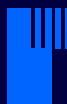
# Incidents trend 1990-2010



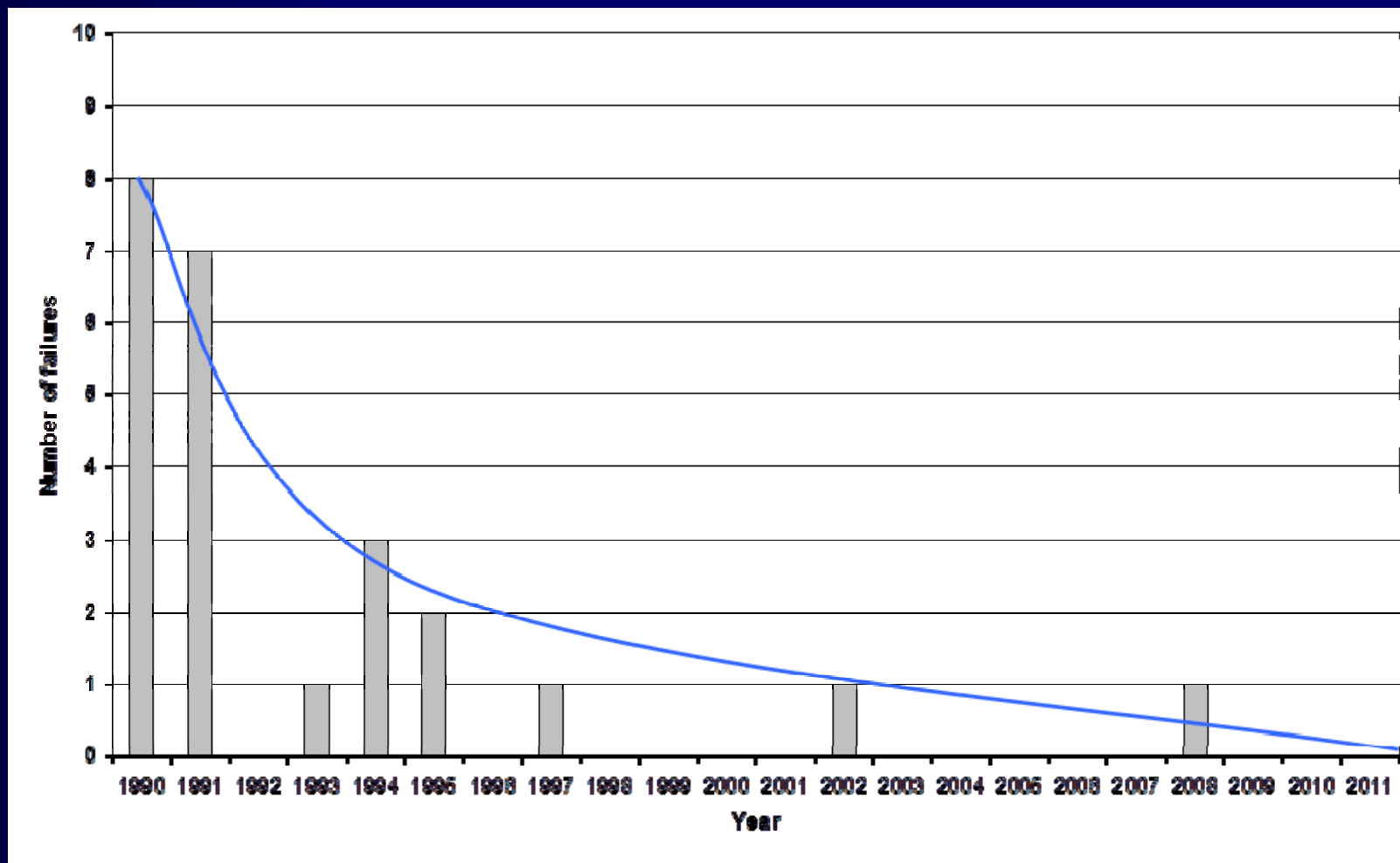


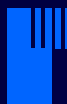
### INCIDENTS and DOWNTIME trends 3-year running average



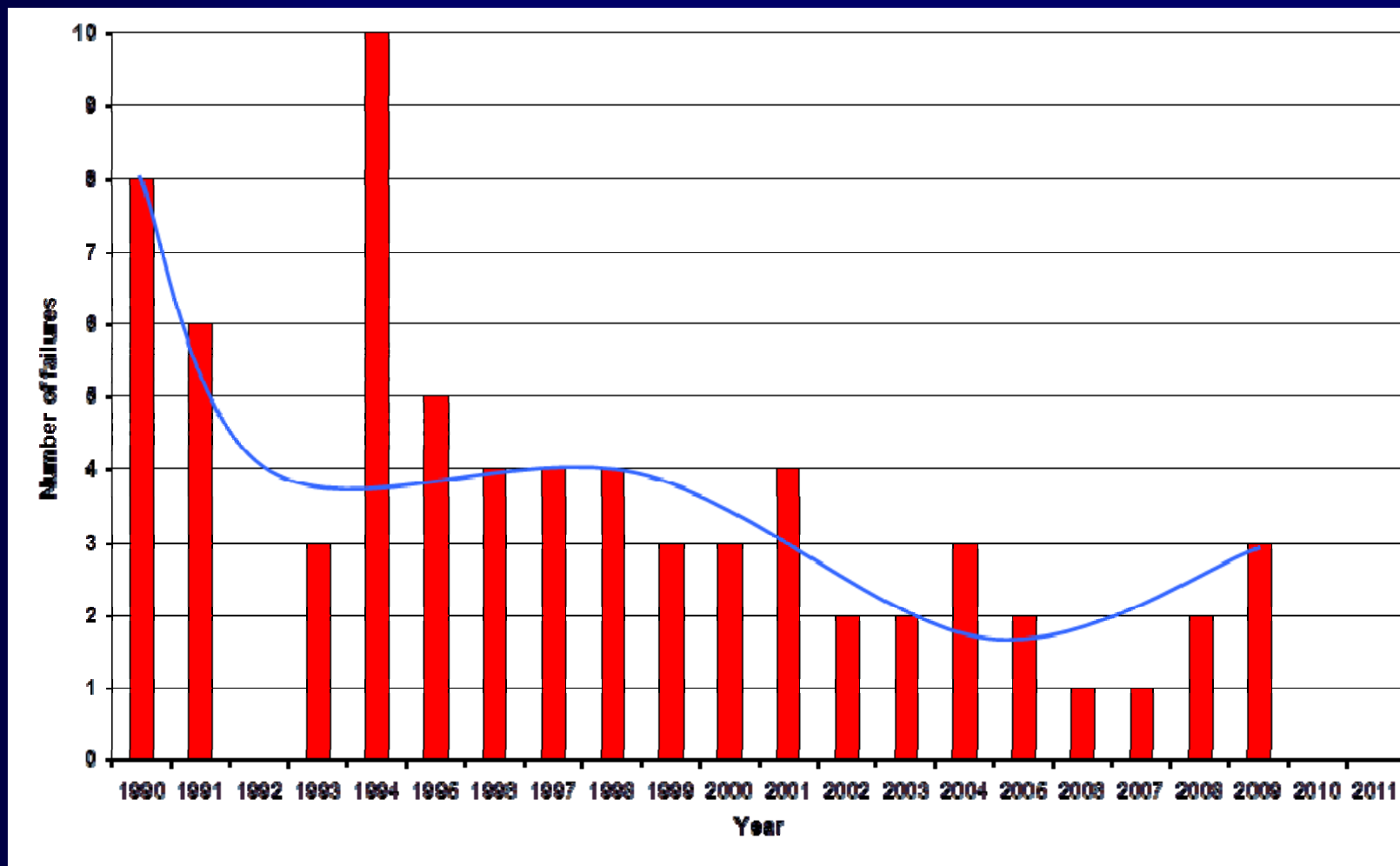


# Floor incidents 1990-2011

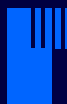




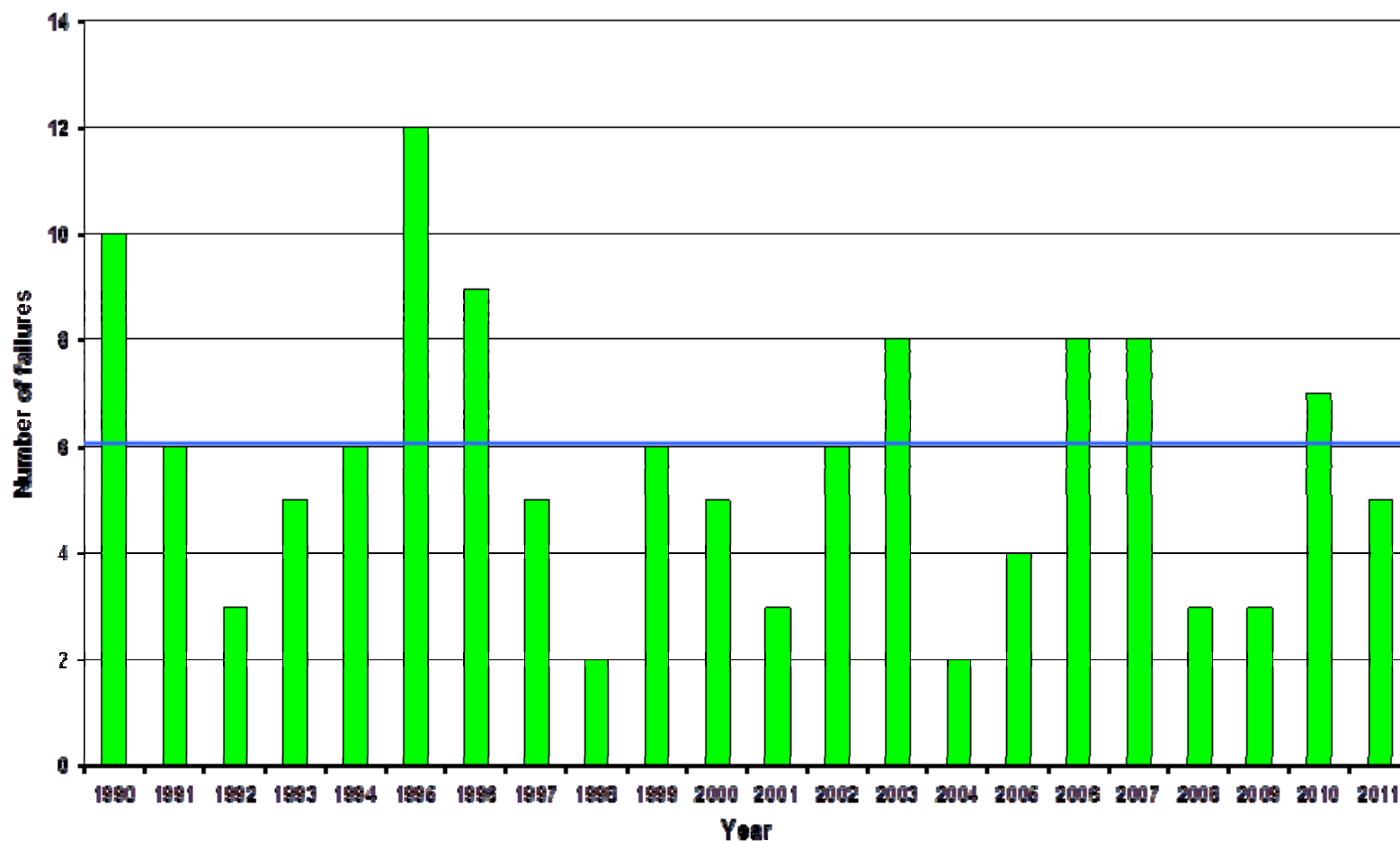
# Superheater incidents 1990-2011

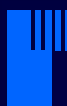




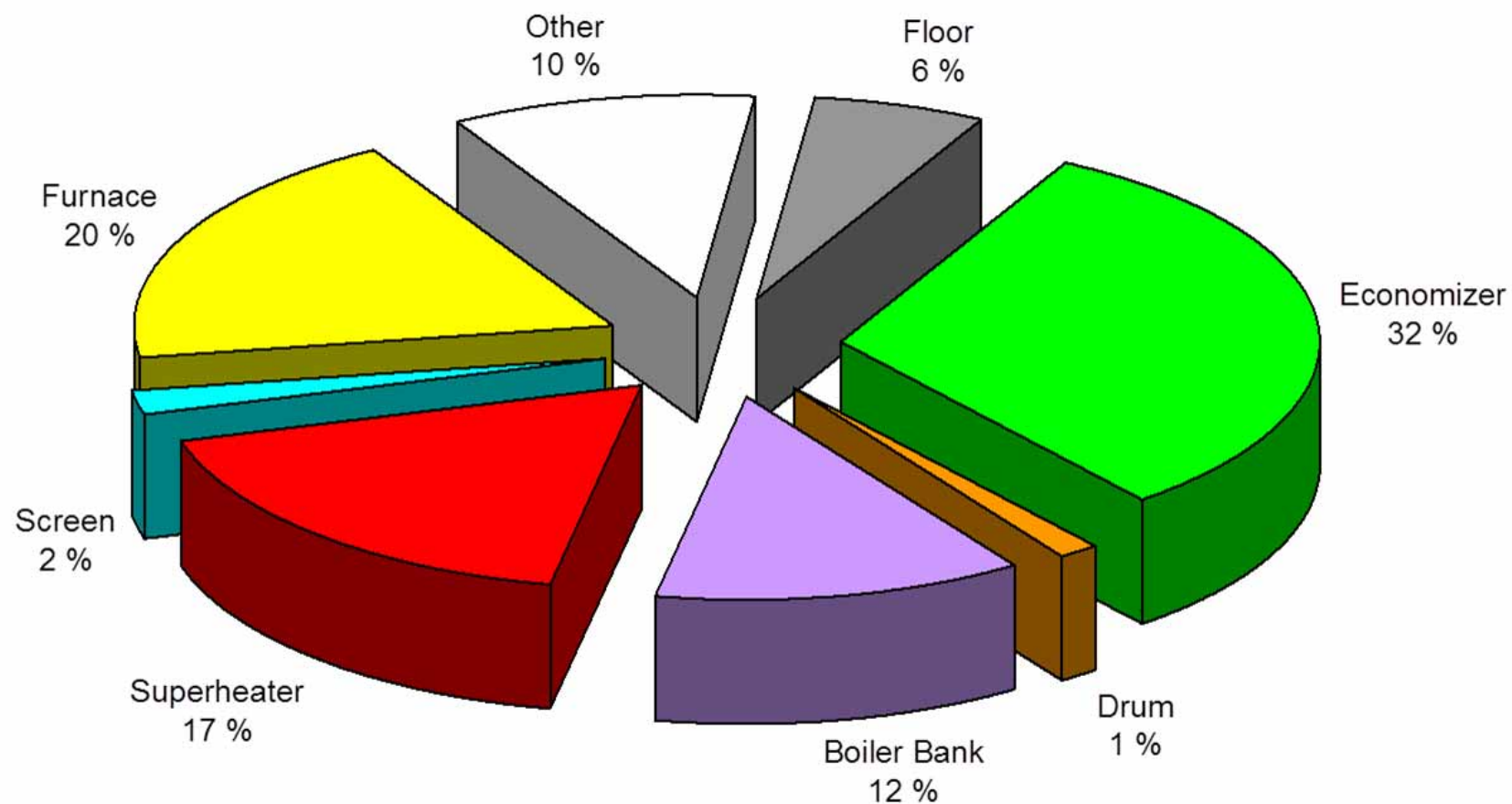


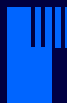
# Economizer incidents 1990-2011





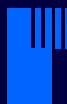
# Cause 1990-2011





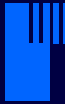
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# Incidents 2011



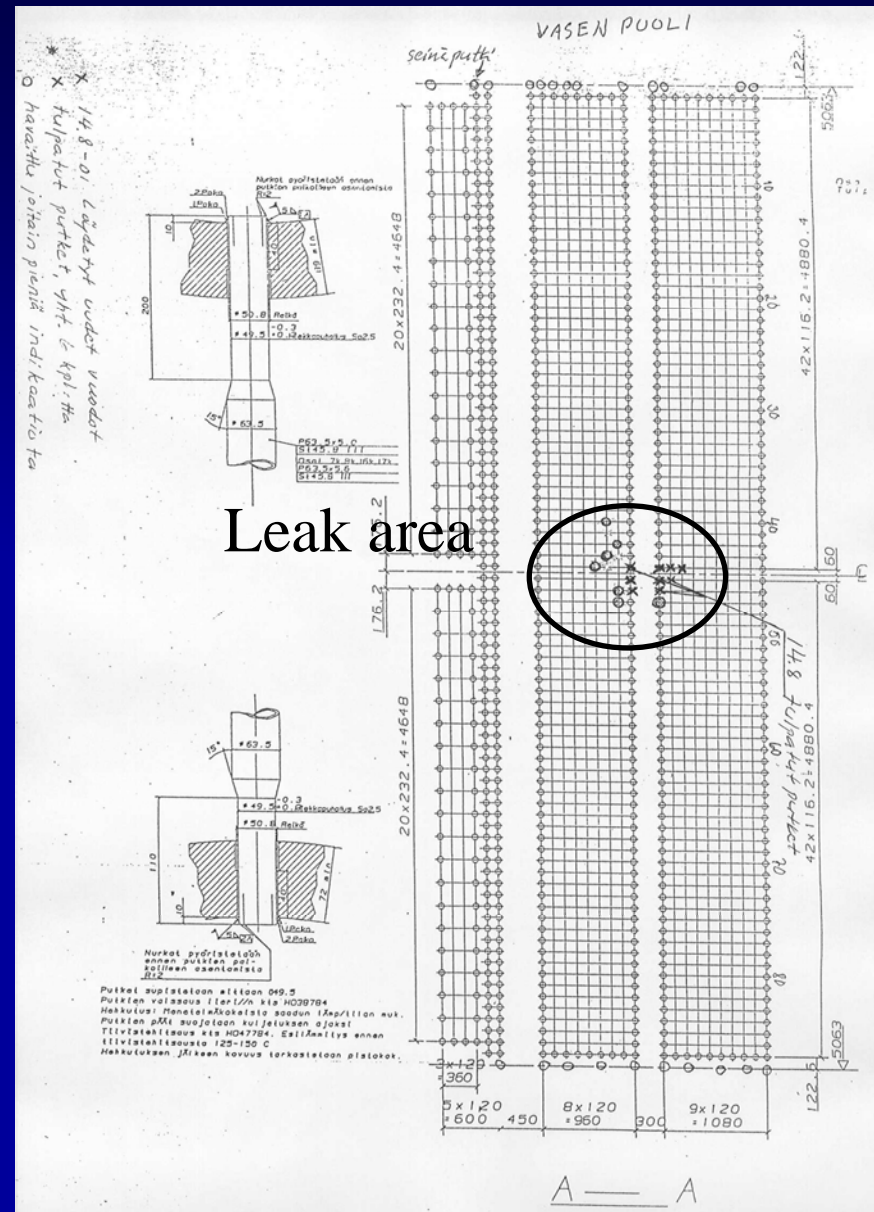
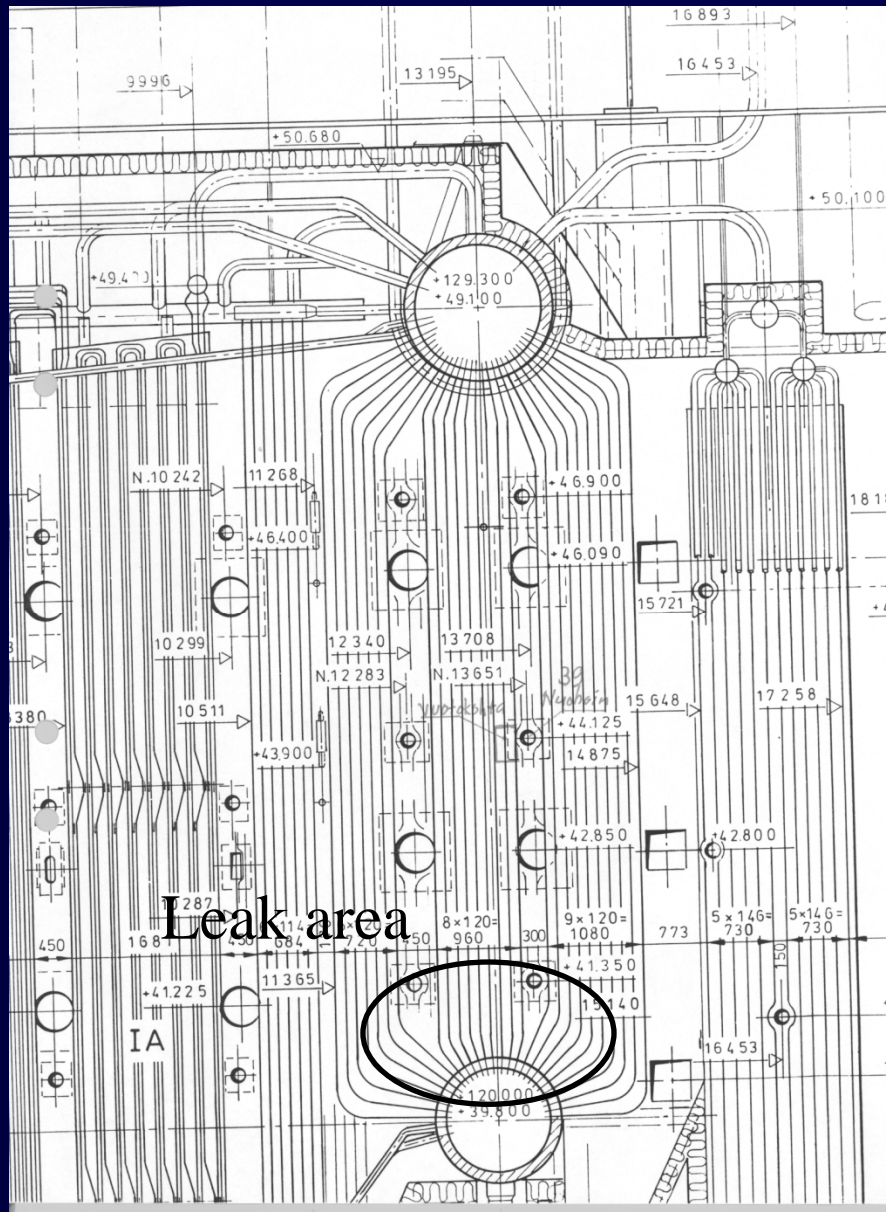
# Incidents 2011

No	Incident headline	Down time
11-1	Leaking economizer	61 h
11-2	Tube leak, screen and explosion	85 h
11-3	Smelt spout cooling water leak	56 h
11-4	Smelt spout cooling water leak	8 h
11-5	Leaking economizer	60 h
11-6	Tube leak, boiler bank	120 h
11-7	Tube leak, superheater	60 h
11-8	Tube leak, boiler bank	60 h
11-9	Tube leak, boiler bank	60 h
11-10	Leaking economizer	72 h
11-11	Leaking economizer	50 h
11-12	Tube leak, boiler bank	70 h
11-13	Leaking economizer	70 h
11-14	Tube leak, wall tube, new compound tube	150 h
	TOTAL	982 h



# 6,8,9,12/2011 Boilerbank leak

- Two-drum boiler from A.Ahlström
- Boiler was in normal load when operator noticed moisture in boiler bank ash conveyer
- Boiler was shutdown -> no water leak to the furnace
- In all cases leaking tubes were found in the center section near lower drum. There have been similar leaks also 1990's (over 90 tubes changed) and 2000's (several tubes repaired or plugged)
- Fatigue stress from vibration of tubes, sootblowers cause excess vibration to the center section of boiler bank.
- Mill will have the single-drum conversion autumn 2012
- The upper and lower drum of the recovery boiler and the steam generating bank between them will be replaced by a new drum and separate boiler bank elements needed for heat recovery

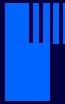






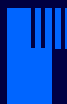




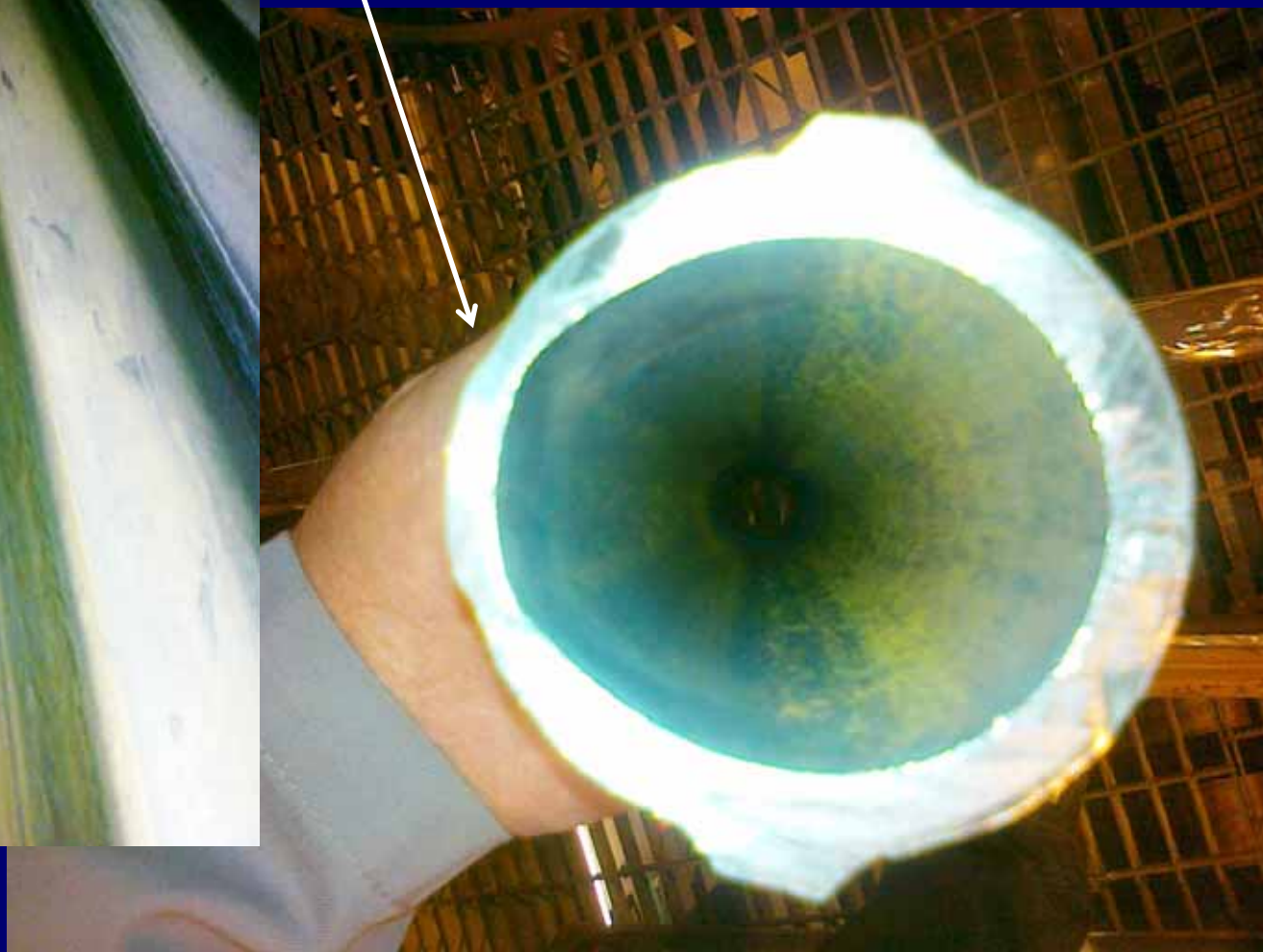


# 14/2011 Furnace wall leak

- Operator heard banging and humming noises from the boiler
- The furnace pressure caused boiler shutdown and operator hit quick stop button
- Water was leaking from a wall tube which had opened because of outer layer of compound tube (304L) had vanished
- This tube was installed only 1 year before the incident, mill had increased compound tube 10 meters up
- Leak was 3 meters above the old and new compound tube joint
- Only this tube was changed, others tubes were ok
- Cause: Tube overheating because of circulation disturbance due to unknown reason/object (water-soluble paper, metal splinters)



Outer layer of the tube  
was vanished





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Thank you for you attention!