

INTRODUCTION OF MITSUBISHI GENERATORS

COMPANY PROPRI ETARY

NOT TO BE REPRODUCED OR DI SCLOSED W THOUT SPECI FI C
WRI TTEN PERMI SSI ON OF MI TUBI SHI ELECTRI C CORPORATI ON
(THI S I S A RED I NK STAMP)

August 2008

CAPABILITY & EXPERIENCE

SUPPLY LIST OF LARGE CAPACITY GENERATORS

| Turbine generator over 800MVA For Thermal power station | | | | |
|--|------|----|------|-----------|
| No. | MVA | kV | rpm | FOB/COD |
| TA | 800 | 25 | 3600 | 1991/1993 |
| TB | 990 | 24 | 3000 | 1998/2000 |
| TC | 990 | 24 | 3000 | 1998/2000 |
| TD | 868 | 23 | 3600 | 1999/2001 |
| TE | 868 | 23 | 3600 | 1999/2002 |
| TF | 868 | 23 | 3600 | 2000/2002 |
| TG | 868 | 23 | 3600 | 2000/2003 |
| TH | 844 | 24 | 3000 | 2005/2006 |
| TI | 844 | 24 | 3000 | 2005/2007 |
| TJ | 1008 | 27 | 3600 | 2007/2009 |
| TK | 1045 | 27 | 3000 | 2010/2012 |

FOB:Free On Board

COD:Commercial Operation Date

| Turbine generator over 1000MVA For Nuclear power station | | | | |
|---|------|----|------|-----------|
| No. | MVA | kV | rpm | FOB/COD |
| NA | 1300 | 24 | 1800 | 1976/1979 |
| NB | 1300 | 24 | 1800 | 1976/1979 |
| NC | 1300 | 24 | 1800 | 1985/1987 |
| ND | 1310 | 24 | 1800 | 1990/1991 |
| NE | 1310 | 24 | 1800 | 1990/1993 |
| NF | 1310 | 24 | 1800 | 1991/1994 |
| NG | 1310 | 24 | 1800 | 1995/1997 |
| NH | 1600 | 29 | 1800 | 2000/2009 |
| NI | 1600 | 29 | 1800 | 2003/2009 |
| NJ | 1020 | 21 | 1500 | 2007/2009 |
| NK | 1407 | 24 | 1500 | 2011/2013 |
| NL | 1407 | 24 | 1500 | 2012/2014 |
| NM | 1715 | 30 | 1800 | 2014/2016 |
| NN | 1715 | 30 | 1800 | 2014/2016 |

RECENT NUCLEAR GENERATOR

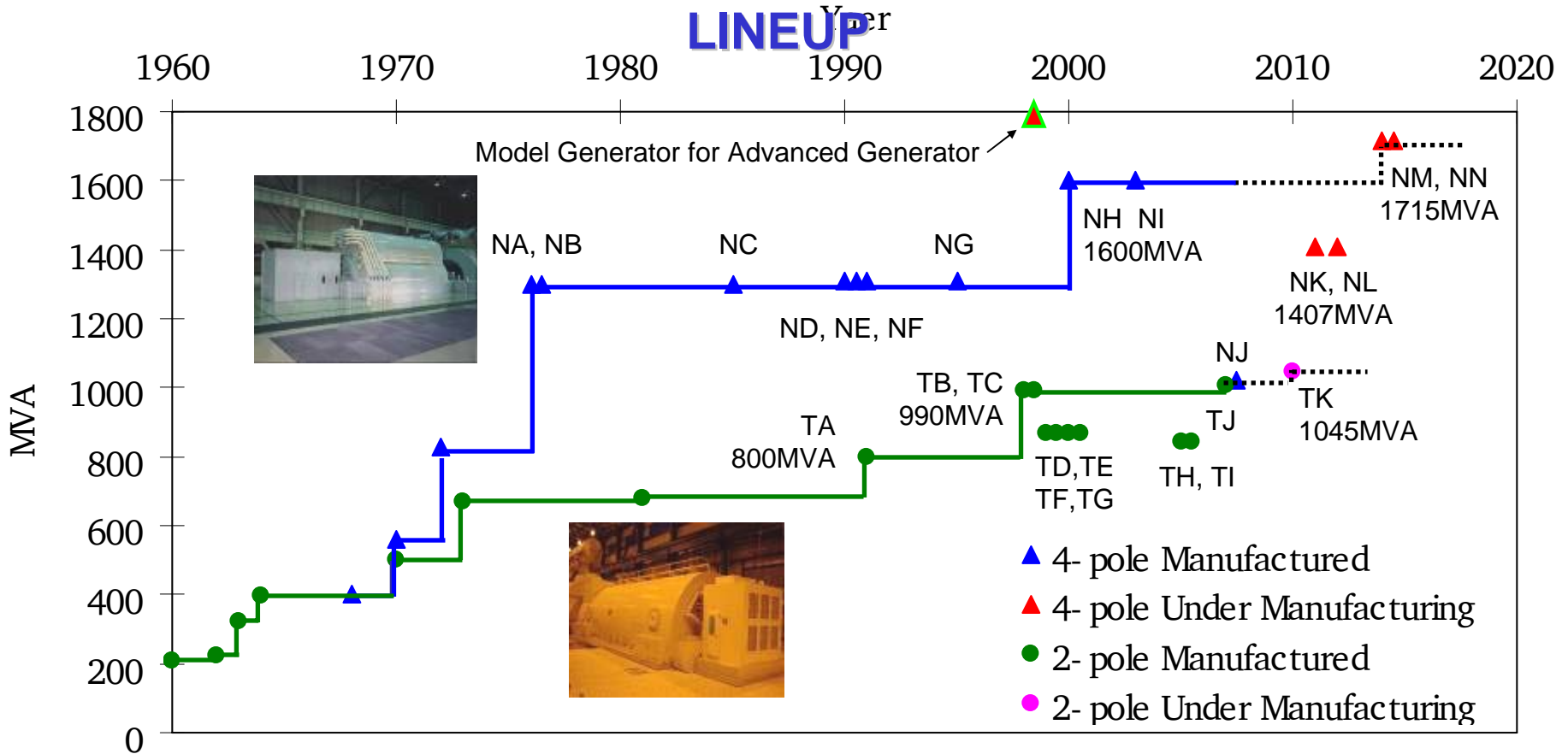
RECENT TREND OF NUCLEAR GENERATOR

- **LARGER CAPACITY 1000MVA ~2000MVA**
For APWR、ABWR、AP1000、EPR,etc

MEASURES FOR HIGHER RELIABILITY

- **APPLICATION OF PROVEN TECHNOLOGY OF COOLING METHOD**
- **LONG TERM RELIABILITY VERIFICATION OF INSULATION**
- **APPLICATION OF ADVANCED TECHNOLOGY**
- **VERIFICATION WITH MODEL GENERATOR**

4 POLE GENERATOR DEVELOPMENT HISTORY AND LINEUP



| | | |
|--------------|--------------------------|-----------------------|
| Cooling type | Rotor : Hydrogen cooled | |
| | Stator : Hydrogen cooled | Stator : Water cooled |

TECHNICAL FEATURES OF LARGE CAPACITY 4POLE GENERATORS

COIL END SUPPORT WITH
CONE STRUCTURE

LARGE DIAMETER ROTOR

STATOR COIL
END

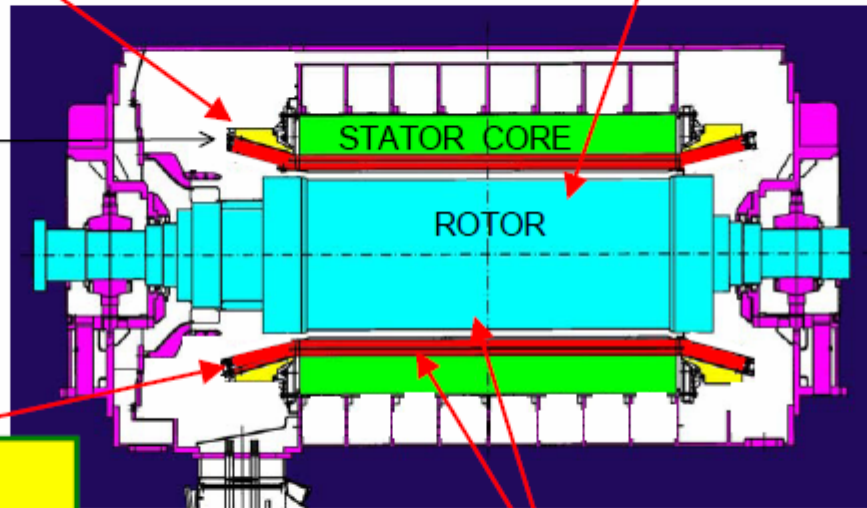
STATOR CORE

ROTOR

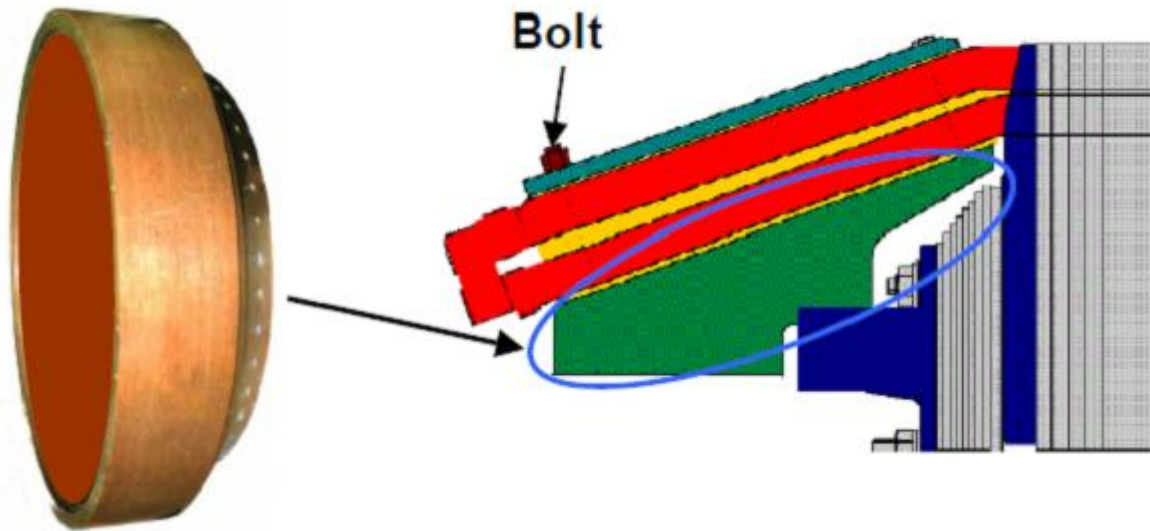
LEDA BOX

30kV CLASS
HIGH VOLTAGE
INSULATION SYSTEM

COIL COOLING SYSTEM
STATOR : WATER COOLING
ROTOR : HYDROGEN INNER COOLING



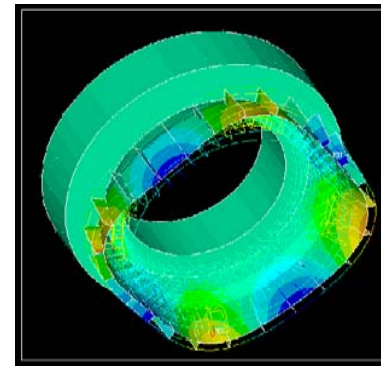
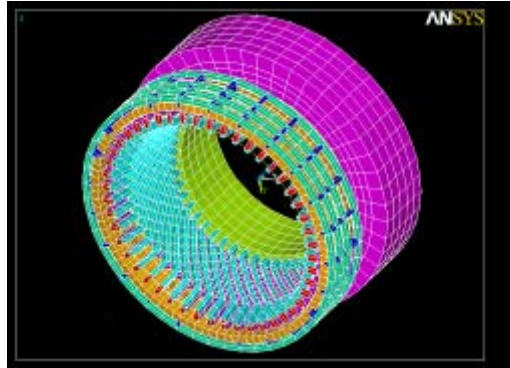
TECHNICAL FEATURES OF LARGE CAPACITY 4POLE GENERATORS HIGHER RIGIDITY COIL END STRUCTURE



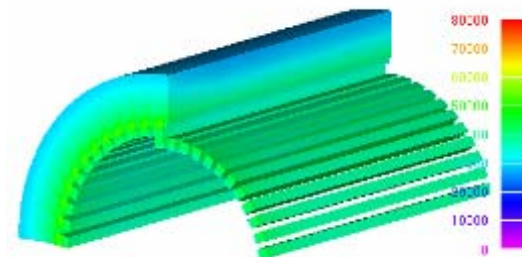
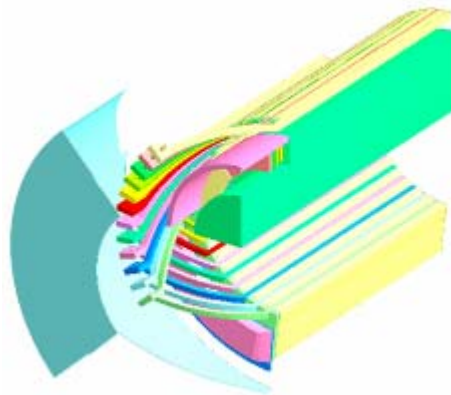
Cone Support

- High rigidity supported by Cone structure
- Stator Coil fixed by Bolts
ensures high quality (Low Skill Dependent)

TECHNICAL FEATURES OF LARGE CAPACITY 4POLE GENERATORS ADVANCED TECHNOLOGY FOR STRUCTURAL DESIGN & ELECTRICAL DESIGN



COIL END VIBRATION ANALYSIS



MAGNETIC FIELD ANALYSIS OF GENERATOR

VERIFICATION WITH 4POLE MODEL GENERATOR

- PERFORMANCE UNDER RATED & FOLLOWING SEVERE CONDITIONS
 - THREE PHASE SUDDEN SHORT CIRCUIT TEST FROM RATED VOLTAGE
 - LINE TO LINE SHORT CIRCUIT TEST AT EXCESS I_2 CONDITION
 - ROTATIONAL TEST AT 120% OVER SPEED
- INSULATION CHARACTERISTICS FOR 30kV CLASS
 - 30kV CLASS HIGH POTENTIAL TEST
 - V-T CHARACTERISTIC TEST

SPEC. OF MODEL GENERATOR

- GEN. CROSS SEC. : SAME AS 1800MVA MACHINE
- STATOR COIL END : DITTO
- CORE LENGTH : 1/5 OF 1800MVA MACHINE

