Lib sc. 8; 1971; PAPER E.

Steam Generator Production Engineering: Depth Version of CC. (Classification problems. 48). (Design series. 21).

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[A freely-faceted depth classification version of Colon Classification for compound subjects going with the Host Subject "D8, D4h Steam Generator Production Engineering" is given. The use of different devices — such as, Geographical Device, Environment Device, Numerical Device, and Alphabetical Device — has helped in achieving economy in schedule building. An index to the schedule, eleven examples of subjects classified, and an alphabetical index to the subjects are given. The pattern of incidence of Quasi Isolates is commented upon.]

ABBREVIATIONS USED :

(AD)	= Alphabetical Device	(HS)	= Host Subject
(BS)	= Basic Subject	(M)	= Matter Isolate
CC	= Colon Classification	(ND)	= Numerical Device
(CN)	= Class Number	(P)	= Personality
(E)	= Energy Isolate	(QI)	= Quasi Isolate
(GD)	= Geographical Device	(SD)	= Subject Device

1 Scope of the Paper

This paper demonstrates the design of a depth classification version of CC for compound subjects going with the (HS) "D8, D4h Steam Generator Production Engineering". The methodology for designing a freely faceted scheme for classification based on postulates, canons, and principles, has been used (3, 6).

2 Schedule of Isolates

21 SPECIATORS IN (1P1)

The Quasi Isolates helpful in deriving speciators to form Compound Isolates in (1P1), are given in Table 1. The sequence among the (QI), determined by using Group Strategy and Wall

Picture Principle, is deemed to be helpful to a majority of the specialists in the subject (1, 6).

211 *Table* 1 *List of Quasi Isolates in* (1P1)

SN	Sector (S-)	Quasi Isolate
1–37		BY WHOLE-COMMODITY ASSOCIATED ATTIBRUTES
1	(A)	By Trade name (Brand)
2	(1)	By Make
3–5		By Purpose
3	ZA	By Application
4	Z9L	By Environment
5	Z1	By Portability
6–37		By Overall design parameter
6–15		By Efficiency
6	Zs	By Topping
7	Zh	By Reheat
8	Zb	By Superheat
9–15		By Economiser
9	XS	By Direction of gas flow
10	XP	By Direction of water flow
11	XJ	By Geometrical arrangement
12	XF	By Design
13	XC	By Form of heating surface
14	X5	By Tube bank
15	X2	By Thermal performance
16–18		By Air heater
16	Xm	By Variety
17	Xf	By Arrangement
18	Xc	By Direction of gas flow
19	V	By Capacity
20	UNZ	By Design pressure
21	UGZ	By Thermal efficiency
22–23		By Temperature
22	UF	By Temperature at outlet
23	UC	By Temperature at inlet
24–25		By Heat transfer
24	RZ	By Mode
25	Ra	By Medium
26	AZ	By Fuel
27	9PZ	By Rate of combustion
28	9MZ	By Number of gas passes
29	9L	By Circulation
30–32		By Dimension
30	9CZ	By Overall size
31	9C	By Width
32	9B	By Height
33–37		By Construction
33	99V	By Site of assembly
34	991	By Material of construction
35	99a	By Method of support

36–37		By Furnace construction
36	91	By Refractory wall
37	901	By Tube position
38–51		BY ORGAN-ASSOCIATED ATTRIBUTES
38–43		By Furnace
38	9mZ	By Variety
39	9f	By Number
40	9e	By Position
41	9d	By Volume
42	9c	By Heating surface area
43	1	By Height
44–45		By Burner
44	0A	By Variety
45	01	By Position
46–49		By Drum
46	0zA	By Variety
47	0zI	By Number
48	0y	By Position
49	0x	By Length
50	0kZ	By Tube
51	0bZ	By Header
52–56		BY OPERATION ASSOCIATED ATTRIBUTES
52–53	zAZ	By Firing method
52		By Solid fuel
53		By Liquid fuel
54	z0Z	By Draught
55–56		By Temperature control
55	zsZ	By Method
56	yZ	By Device

22 SCHEDULE OF (1P2)

In the schedule of (1P2), each isolate denotes a major organ or component of the steam generator.

23 SCHEDULE OF (1P3)

In the schedule of (1P3), each isolate denotes a sub-organ or sub-component of a major organ or component enumerated in (1P2).

24 SCHEDULE OF (1M1)

A schedule of special Property Isolates is given in (1M1). A compound Matter-Property Isolate can be formed by compounding two or more isolates taken from this schedule. A "hyphen" (-) is used between the components. Isolates from the schedule of Common Property Isolates (4, 5) can be used wherever found necessary.

25 SCHEDULE OF (1E)

A schedule of special Energy Isolates is given. Isolates

from the schedule of Common Energy Isolates can be used wherever found necessary.

26 SCHEDULE OF (2M1)

The schedule of (2M1) isolates consists of Method Isolates associated with the (1E) isolate "85 Prevention".

3 Host Subject

In CC, Ed 7, "Steam generator" (Boiler) is enumerated as an isolate in (1P1) for subjects going with the (BS) "D8 Commodity Production Engineering", as shown below:

D8 Commodity Production Engineering
D8,D4h Steam generator
D8,D4h4 Fire-tube
D8,D4h5 Water tube

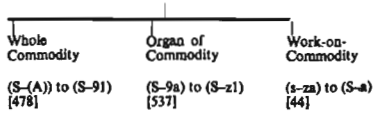
4 Notation

The notation assigned to the different (QI) in (1P1) in our earlier schedule for the subject (2) has been revised affecting a saving in the number of digits in a (CN). The sectors assigned are shown in column 2 of Table 1 in Sec 211.

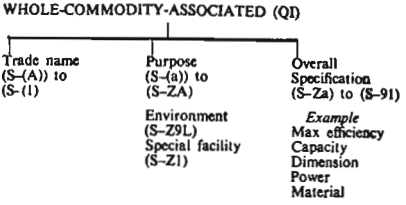
5 Pattern of (QI) in (1P1): Observation

Depth versions of CC for about thirty (HS) in Commodity Production Engineering have been designed so far. The normal pattern of incidence of (QI) in (1P1) for such subjects is indicated in Sec 51 to 53. The preferred pattern of allocation of sectors and the number of Isolate Numbers available in any one order of array in the range of sectors allocated, with the condition that no Isolate Number has more than three digits, are also indicated in Sec 51.

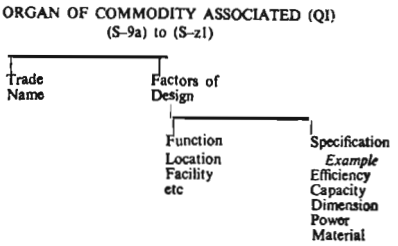
51 THREE GROUPS OF (QI)



52 WHOLE-COMMODITY-ASSOCIATED (QI)



53 ORGAN OF COMMODITY-ASSOCIATED (QI)



The pattern of incidence of organ-associated (QI) is similar to that for whole-commodity-associated (QI). The pattern may repeat for each of the organs of the commodity. The organ-associated (QI) may be arranged among themselves according to an appropriate Principle for Sequence of Isolates, such as, the principle of Spatial Contiguity and its corollaries.

54 WORK-ON-COMMODITY-ASSOCIATED (QI)

A work-on-commodity associated (QI) is usually associated with an action on the commodity. For example, method of assembling (manually assembled commodity, automatically assembled commodity), method of operation, method of control, and method of maintenance.

55 HELPFULNESS OF RECOGNISING PATTERN

The helpfulness of recognising an overall pattern in the variety and sequence of (QI) in (IPI) for subjects going with a

(HS) in Commodity Production Engineering, in the methodology and work of designing a scheme for classification, may be summarised as follows:

1 In designing schemes for classification of subjects going with different (HS) in Commodity Production Engineering, economy in schedule building can be achieved to an appreciable extent. For example, in formulating the different (QI) in (IPI), in arranging the (QI) in a helpful sequence, and in assigning notation. The work in the idea plane in designing a depth classification scheme largely consists of formulating (QI) in (IPI) and arranging them in a helpful sequence.

2 The canons and principles of classification — such as the Canons of Relevance, Consistent Sequence, and Mnemonics, and the Principles for Sequence of Isolates, can be conveniently conformed to.

3 The extension of a scheme for classification designed for the classification of whole books to a depth version for the classification of micro documents can be done without greatly disturbing the structure of the schedules and even preserving the notation used by the scheme for the whole book level. The universe of subjects is ever dynamic; it is becoming increasingly more dynamic. It is practically impossible to anticipate all the varieties of subjects that may emerge in future. However, the subjects likely to be embodied in books in the near future can be anticipated to some extent. For, it is generally found that subjects which are to-day embodied in micro documents only are the ones likely to attract whole books in future. Thus, although the rate of development of the universe of subjects is continuously forcing the rate of obsolescence of even schemes primarily meant for the classification of whole books only, a classifier with a knowledge of the methodology for the design and development of freely faceted classification based on explicitly stated postulates, canons, and principles, can extend the scheme on right lines to meet many of the developments in the universe of subjects.

4 The sectors suggested for the groups of (QI) should normally be adequate to accommodate the isolates and speciators derived on the basis of the (QI) in each group of (QI). Provision has been made to allow the choice among the sectors for each of the (QI) so as to facilitate the use of different devices including "Divide like" Device.

5 Again, at the notational level, conformity to the Canons of Mnemonics — Scheduled, Systematic, and Seminal — can be secured because of the provision for choice among the sectors in each group of (QI).

6 The pattern of grouping of the (QI) and the sequence of the (QI) within the groups, more or less parallel the sequence of

ideas of the specialist concerned with the design for production of a commodity: that is, the concept of the commodity to meet certain purpose defined by the consumer, the design specification of the commodity as a whole — that is, overall efficiency, dimension, power to be used, and material of make — in conformity with the purpose which the commodity is to serve, the design features of the components of the commodity to secure efficiency in their respective functions and to conform to the overall design specification of the commodity as a whole, and then the ideas relating, to the working of the commodity, namely, starting, operating maintaining, and controlling.

7 The pattern of incidence of (Q1) mentioned above is also similar to that in the schedule of (1P1) for (HS) in Commodity Production Technology.

6 Index to Schedule

Note.—1 The terms enumerated in the schedules in Sec 7 are listed in this index. However, terms denoting ideas, the numbers for which are indicated, to be derived using such devices as (AD), (ND), (SD) are not included.

2 The number from the Schedule given against each index entry is preceded by an abbreviation for the name of the appropriate fundamental category — such as, (1P1), (1M1), and (1E),

7 Schelude

zb Damper bypass
zd Recirculation
zf Differential firing
zh Attemperation
zh2 Spray type (Direct contact)
zh3 Drum-type surface
zh4 Submerged
zm Firing rate control
zsZ *By Method*
zt Manual
zv Semi-automatic
zs Automatic

z0Z *By Draught*
z1 Natural
z3 Induced
z5 Forced (Pressure furnace)
z8 Balanced

zAZ *By Firing*
zBZ For solid fuel
zD Stoker

T (A2) *into* (A1) *begins*
zE Chain grate
zF Travelling grate
zG Coking grate
zH Sprinkler
zH2 Shovel
zH5 Rotary
zK Spreader
zM Retort
zM1 Single
zM2 Multiple
zM3 Screw type
zM6 Ram type
zNZ For liquid fuel
zP Horizontal firing
zQ Vertical firing
zR Opposed (turbo)
zS Tangential
T (A2) *into* (A1) *ends*

zSZ *By Method*
zT Hand
zV Semi-automatic
Xz Automatic

0aZ *By Organ-associated attributes*
0bZ *By Header*
0d Box
0o Sectional (Sinuous)
0kZ *By Tube*
0m Horizontal straight
0n Horizontal return
0s Vertical
0t Inclined
0u Finned

0wZ *By Drum*
0x *By Length*
Note. – *Division by* (ND).
0y *By Position*
0y1 Longitudinal
0y3 Cross
0z *By Number*
Note. – *Division by* (ND).
0zA *By Variety*
0zF Drumless

0zX *By Burner*
0zY *By Position*
01 Under-fire
02 Side-fire
03 Over-fire
04 Corner
06 Direct (Over 2000°F)
0AZ *By Variety*
0B Circular
0B2 Return flow
0C Multi-tip
0F Oil burner
0F2 Spray
0F3 Pressure jet
0F5 Rotary
0F6 Rotamiser
0FB Low pressure
0FD Rotavac
0FF Y (Medium pressure)
0FG Oil-o-matic
0FJ Quiet May
0FK Concentrated combustion
0FN Self-proportioning
0FR Gas burner
0G Centre-fire (gun)
0H Multispud
0K Coke oven gas
0M Circular gas burner
0N Non-aerated
0N1 Flat flame
0N2 Pinhole
0N4 Nozzle mixing

0P Pre-aerated
0P1 Aerated (Atmosphere)
0R1 Bar
0R2 Por-ignitable
0R3 Ring
0R4 Ribbon
0R6 Tunnel

0Z *By Furnace*
(S–1) *By Height*
Note.—Division by (ND).
9c *By Heating surface area*
Note.—Division by (ND)
9d *By volume*
Note.—Division by (ND).
9e *By Position*
9e1 Internal
9e5 External
9f *By Number*
Note.—Division *by* (ND).
9mZ *By Variety*
9n Twin surface
9p Scotch
9r Dutch oven
9s Cyclone
9t Turbo
9v Combination
9w Water screen
9z1 Hopper bottom
9z3 Slagtap (wet)
90x *By Construction*
90y *By Furnace construction*
90z *By Tube positioning*
902 Close spaced
903 Welded ligament panel
904 Flat stud welded to side
905 Full stud wall, Refractory covered
906 Tube and tile
908 Tube spaced from refractory

91Z *By Refractory wall*
92 Solid
95 Water cooled
951 Bare plate
952 Bare tube
953 Extended surface
955 Protected tube
98 Air cooled
981 With clinker chill
985 With water back
99az *By Method of support*
99b Suspended
99d Structural support

T2 (A2) *into* (A1) *begins*
99f Independent of brick setting
99h On brick setting
T2 (A2) *into* (A1) *ends*

991Z *By Material of construction*
992 Steel

T3 (A2) *into* (A1) *begins*
993 Carbon (plain)
994 Low alloy
995 Straight chromium
996 Austenite
998 Integral clad
T3 (A2) *into* (A1) *ends*

99B Cast iron

T4 (A2) *into* (A1) *begins*
99C White
99D Gray
99F Malleable
99G Ductile
T4 (A2) *into* (A1) *ends*

99K Non-ferrous metal

T5 (A2) *into* (A1) *begins*
99L Al-Mn
99M Ni-Cu
99P Other Cu alloys
99Q Dioxidised copper
T5 (A2) *into* (A1) *ends*

99S Concrete
99T Prefab
By Site of assembly
99V Shop assembled

T6 (A2) *into* (A1) *begins*
99W Packaged
99X Semi-shop assembled
T6 (A2) *into* (A1) *ends*

99Y Site erected (Field erected)

9AZ *By Dimension*
9B *By Height*
Note.—Division by (ND).
9C *By Width*
Note.—Division by (ND).
9CZ *By Size* (Overall)
9D Maniature
9E Small
9F Medium
9G Large

9L	*By Circulation*
9L1	Natural
9L2	Dual
9L5	Positive
	T (A3) *into* (A1) *begins*
9L6	Once through (Benson)
9L7	Modified (Monotube)
9L8	Forced (Lamont)
	T (A3) *into* (A1) *ends*
9MZ	*By Number of gas pass*
9N	Single
9P	Multiple
	Note.—Division by (ND).
9PZ	*By Rate of combustion (in Btu)*
9R	Low (Upto 100)
9S	Medium (100 to 999)
9T	High (1,000 to 9,999)
9U	Very high (10,000 to 99,999)
9V	Ultra high (above 100,000)
	Note.—For specific rate, division of 9R *to* 9V *by* (ND). *(Illustrative)*
9R55	55 Btu
9T28	2,800 Btu
9U35	35,000 Btu
9V25	250,000 Btu
AZ	*By Fuel*
B	Solid
	T6 (A2) *into* (A1) *begins*
C	Pulverised coal
C1	Anthracite
C2	Semi-anthracite
C3	Bituminous coal
C31	Low volatile
C32	Medium volatile
C33	High volatile
C33A	A
C33B	B
C33C	C
C4	Sub-bituminous coal
C5	Lignite
C6	Brown coal
C7	Hard coal
C8	Peat
E	Coke
E1	High temperature
E2	Low temperature
E3	Beehive
E4	By-product
E5	Fluid coke
E6	Coke breeze
E7	Gas works coke
E8	Domestic coke
EB	Broken coke
EC	Foundry coke
ED	Electrode coke
G	Oil refinery waste
G1	Petroleum coke
G2	Acid sludge
G3	Soda bottom
G4	Neutralised sludge
G5	Acid tar
G6	Wash tailing
G7	Tank cleaning
G8	Petroleum pitch
J	Agricultural product
J3	Cereal substance
J31	Straw
J32	Corn stalk
J33	Rice hull
J34	Oat hull
J35	Corn cob
J8	Coffee grounds
J91	Other wastes
JB	Wood
JB1	Soft
JB3	Hard
JB6	Bagasse
M	Liquid (Oil)
M1	Petroleum oil
M2	Gasoline
M3	Kerosene
M5	Gas oil
M6	Shale oil
M7	Fuel oil
M8	LPD
P	Gaseous fuel
P1	Carbon monoxide
P4	Butane-air (Propane-air)
P6	Methane-air
PB	Natural gas
PC	Refinery oil gas
PD	Blast furnace gas
PF	Coke oven gas
PG	Carburetted water gas
PJ	Producer gas
PM	Anthracite
PN	Bituminous coal
PQ	Coke

PR Retort coal gas
PT Water gas, Coke
PV Water gas, Bituminous
PX Multiple fuel
PY Convertible

R *By Heat transfer medium*
Rb Water (favoured)
Rc Vapour
Rd Chemical

T2 (A3) *into* (A2) *begins*
Re Low temperature range (Less than 50°F)

T1 (A4) *into* (A2) *begins*
Rf Antifreeze
Rf1 Alcohol
Rf2 Glycerine
Rf3 Glycol
Rg Brine
Rg1 Calcium cholride
Rg2 Sodium chloride
Rh Refrigerant
Rh1 Ammonia
Rh2 Halocarbon compound
Rh3 Methyl chloride
Rh5 Sulphur dioxide
Rj Hydrocarbon oil
Rj5 Petroleum product
Rk Organosilicate

T (A4) *into* (A2) *ends*
Rm Middle temperature range (200°F to 850°F)

T2 (A4) *into* (A2) *begins*
Rn Liquid metal
Rn8 Mercury
Rp Hydrocarbon oil
Rp5 Petroleum product
Rp6 Mobiltherm 600
Rp8 Mobiltherm light
RpA Dowtherm A
RpB Dowtherm B
RpE Dowtherm E
Rq Organo-silicate

T2 (A4) *into* (A2) *ends*
Rr High temperature range (600 to 1400°F)

T3 (A4) *into* (A2) *begins*
Rs Fused salt
Rs1 Sodium nitrate
Rs2 Sodium nitrite
Rs3 Potassium nitrate
Rs4 Lithium fluoride
Rs5 Sodium fluoride
Rs6 Potassium fluoride
Rs7 Beryllium fluoride
Rt Molten salt
Rt1 Sodium
Rt2 Potassium
Rt4 Sodium-Potassium alloy

T3 (A4) *into* (A2) *ends*
Ru Very high temperature range (Above 1200°F)

T4 (A4) *into* (A2) *begins*
Rv Molten salt
Rv1 Bismuth
Rv2 Lithium
Rv3 Lead
Rv4 Tin
Rv5 Zinc
Rv6 Lead-Bismuth alloy

T4 (A4) *into* (A2) *ends*
T2 (A3) *into* (A2) *ends*

RZ *By Mode of heat transfer*
S Direct
S2 Conduction
S3 Convection
T Indirect
T5 Radiant

U *By Temperature* (Overall)
Note.—Division by (ND).
UC *By Temperature at inlet*
Note.—Division by (ND).
UF *By Temperature at outlet*
Note.—Division by (ND).
UGZ *By Thermal efficiency* (%)
UH Low (Upto 24)
UJ Medium (25 to 59)
UK High (above 60)

UNZ *By Design pressure*
UP Low
UQ Power (medium)
UR High
V *By Capacity* (lb/hr)
VB Upto 100
VC 100 to 999
VD 1,000 to 9,999
VE 10,000 to 99,999
VF 100,000+
Note.—For

specific capacity; division of VB to VF *by* (ND).
(*Illustrative*)
VC95 950 lb/hr
VE86 86,000 lb/hr
VK Capacity (in KW)
X *By Method of increasing efficiency*
Xa Air heater
By Direction of gas flow
Xc Parallel
Xd Counter
By Arrangement
Xf Horizontal
Xh Vertical
By Variety
Xm Recuperative (Tubular)
Xn Regenerative (Rotary)
Xr Economiser
By Thermal performance
X2 Non-steaming
X3 Steaming
By Tube bank
X5 Staggered
X6 In-line
By Form of heating surface
XC Plain tube
XD Extended surface
By Design
XF Continuous
XG Return bend
By Geometrical arrangement
XJ Horizontal
XK Vertical
By Direction of water flow
XP Longitudinal
XR Cross
By Direction of gas flow
XS Parallel
XT Counter flow
ZaZ *By Thermal efficiency increase*
Zb Superheater
T7 (A2) *into* (A1) *begins*
Zd Self-draining
Ze Non-draining
Zf Pendent-mounted
T7 (A2) *into* (A1) *ends*
Zh Reheater (Resuperheater)
T8 (A2) *into* (A1) *begins*
Zj Integral
Zk Separately fired
Zm Radiant
Zn Convection
Zp Hairpin loop
Zq Continuous tube
T8 (A2) *into* (A1) *ends*
Zs Topping
T9 (A2) *into* (A1) *begins*
Zt Steam
Zt2 Steam exhaust
Zv Gas
Zv1 Supercharged
Zv2 Self-sustained
Zv3 Power cycle
Zv4 Heating feed water
Zv5 Exhaust heat recovery
Zw Binary vapour
Zw8 Mercury vapour
Z0Z *By Purpose*
By Portability
Z2 Stationery
Z3 Portable
Z9L *By Environment*
Note.—Division by "Common Environment Isolates" *schedule* (Lib sc. 5; 1968; Paper C, Sec. 03) (*Illustrative*)
Z9N1 Corrosive
Z9UR5 Humid
ZAZ *By Application*
ZB Hot water supply
ZC Vapour generation
T10 (A2) *into* (A1) *begins*
ZD Steam
ZE Space heating
ZE1 District (Central station)
ZE2 Building
ZE3 Dwelling
Note.—Division as for '3 in (1P2) of NA Architecture'. (*Illustrative*)
ZE33 Urban
ZE4 Hotel
ZE43 Restaurant
ZE(···) Other building
Note.—Division by (SD). (*Illustrative*)
ZE(2) Library

ZE(NT)	Theatre
ZK	Power utility (KW)
	Note.—Division by (ND).
ZM	Waste heat recovery
	T 11 (A2) *into* (A1) *begins*
ZN	Wood industry
ZP	Machine
ZP2	Diesel engine
ZP7	Nuclear reactor
ZR	Process plant
ZRb	Metallurgical
ZRb4	Ore roasting
ZRb5	Smelting
ZRbB	Iron and steel
ZR3	Food processing
ZR4	Refractories
ZR44	Cement kiln
ZR45	Glass making
ZR5	Oil refinery
ZS	Paper making
	(Black liquor recovery)
ZT	Packing house
ZU	Auxiliary boiler
ZX	Research
Z(···)	Other application
	Note.—Division by (SD).
	T 11 (A 2) *into* (A 1) *ends*
(1)	*By Country of make*
	Note.—Division by (GD).
	(*Illustrative*)
(56)	Great Britain
(73)	USA
(A)	*By Trade name*
	Note.—Division by (AD)
	(*Illustrative*)
(C)	Cochran
(P)	Powermaster

Schedule of (1P2)

A	Support and structure
B	Boiler
C	Furnace, Grate
D	Shell
E	Tube
F	Drum
H	Header
J	Economiser
K	Air heater
M	Superheater
N	Draft
P	Control
Q	Pulverising mill
R	Stoker
S	Dryer
T	Distributor
U	Feed system
W	Water treatment unit

Schedule of (1P3)

1	Support and structure associated
11	Foundation
141	Wall
18	Door. Exit
2	Storage and casing
3	Joining and fastening
32	Brace
35	Stay
36	Connection
4	Separation mechanism
41	Liner
411	Inner
415	Outer
92	Lead
921	Inlet
925	Outlet
93	Control
934	Attemperator
94	Heating mechanism
941	Burner
945	Fuel
96	Cooler
965	Water screen
98	Signal and indicator
984	Alarm
987	Blowdown
9B	Measuring device
9B1	Viscosity
9B2	Flow
9B3	Work. Force
9B4	Temperature
9B5	Pressure
9C	Observation device
9C1	Window
9C2	Manhole
9C4	Lance hole
9F	Safety device
9G	Attenuation/Absorption device
9G4	Shock absorber

Schedule of (1M1)

3	Function
4	Boiler defect
	By Cause
4a	Primary
4b	Defective material
4d	Poor workmanship
4f	Internal corrosion
4f2	Deposit
4f4	Catalyst poison
4g	External corrosion
4h	Erosion
4j	Thermal stress
4k	Metallurgical change
4k2	Hydrogen embrittlement
4m	Poor maintenance
4m4	Failure to clean
4m5	Water supply failure
4r	Failure to control
4r5	Firing
4s	Inadequate water treatment
	By Variety of defect
41	Collapse. Crushing inward
42	Bulging
43	Distortion
44	Cracking
45	Burning. Overheating
46	Explosion
47	Vibration
4F	Smoke

Schedule of (1E)

11	Preparation
111	Removal of foreign material
115	Hydrostatic test
116	Leak inspection
117	Boil out
118	Acid cleaning
121	Cooling
123	Draining
125	Flushing
126	Reinspection
2	Low load operation
22	Safety valve test
23	Superheater cleaning
24	Piping system blow out
25	Test operation
255	Controls
256	Interlocks
258	Auxiliary equipment
3	Normal operation
31	Start up
33	Feedwater supply
34	Firing
36	Combustion air supply
38	Shut down
385	Cooling
5	Control
53	Feed water
55	Fuel
56	Combustion air
58	Clinker
5B	Manual
5G	Automatic
7	Assembly
7B	Manual
7G	Automatic
8	Maintenance. Routine
81	Testing. Checking
83	Detection
85	Prevention
86	Treatment, Repair
8C	Dry storage
8E	Standby storage
8F	Ash removal

Schedule of (2M1)

	Method Isolates for the (1E) Isolate "85 Prevention"
3	Cleaning
31	Scale removal
32	Acid flooding
33	Flushing with water
34	Boil out with alkali
35	Second flushing out
3B	Manual
3G	Mechanical
5	Lighting off
8	Supervision

8 Examples

81 NOTE

Some of the subjects of the documents cited as examples in the classified part in Sec 83 were found to be multifocal. As the examples given in Sec 83 are meant mainly to demonstrate the method of constructing (CN) with the depth schedule, each and every subject dealt with in a document is

not included in the list of examples. Only one or two subjects have been selected from a document.

82 ALPHABETICAL INDEX TO SUBJECTS

Given below is an alphabetical index to the subjects of the documents listed in Sec 83 Classified Entries. The Serial Number of the entry in Sec 83 is given as the Index Number against each entry in this section. The alphabetical subject index has been prepared according to Chain Indexing.

Wet back, Pulverised coal, Medium design pressure, Capacity 8500 lb/hr, Ruston and Hornsby, Water tube steam generator 10
Superheated, Power utility, Water tube steam generator 8
Wood waste, Fuel change, Efficiency 80 per cent, High design pressure, Capacity 580 to 8500 KW, Hot water supply, Vekos Powermaster, Water tube steam generator 11

83 Classified Entries

D8 COMMODITY PRODUCTION ENGINEERING
D8, D4h Steam Generator
D8, D4h; 3:g37(D8,B4)
STEAM GENERATOR, FUNCTION, SIMULATION, HYBRID COMPUTER
1 N70 BLACK (D M). Study of dynamic behaviour of a boiler plant using hybrid computing techniques. (J Inst Fuel. 43;1970;467-75).

D8,D4h-0wZ,93;a17&gD8 D4hc11
STEAM GENERATOR, DRUM TYPE, CONTROL EQUIPMENT, EFFICIENCY *influenced by* LOAD
2 N68 UNBEHAUEN (H). On load dependence of the stability and control quality in interconnected temperature control for the live steam of a drum boiler [in German] (Brennstoff-Warme-Kraft. 20; 1968; 463-69).

D8,D4h5-C8;4g:85;(CUSO4)
STEAM GENERATOR, WATER TUBE, PEAT FIRED, EXTERNAL CORROSION, PREVENTION, COPPER SULPHATE
3 N70 O'CONNOR (E F). Use of copper salts for inhibition of external fouling of peat fired. boilers. (J Inst Fuel. 43; 1970; 449-50).

D8,9J5-ZE-VK233+-87-PB-99W-99B0-P1-0e
STEAM GENERATOR, WATER TUBE, SPACE HEATING, 87-233 KW CAPACITY, NATURAL GAS FUEL, PACKAGED ASSEMBLY, CAST IRON CONSTRUCTION, AERATED BURNER, SECTIONAL HEADER
4 N70 IDEAL STANDARD 525. (Steam heat engine. 89;1970:37).

D8, D4h; 5-JK-M;4f2:g(E)
STEAM GENERATOR, WATER TUBE, POWER UTILITY, OIL FIRED CORROSION DEPOSIT, EVALUATION, CHEMICAL ASPECT
5 N70 HALSTEAD (W D). Some chemical aspects of fireside corrosion in oil-fired boilers. (J Inst Fuel. 43; 1970,:234-9).

D8, D4h5-ZK,U;b95:fD;bV7D5
STEAM GENERATOR, WATER TUBE, POWER UTILITY, FEED SYSTEM, VIBRATION, ANALYSIS, ELECTRONIC MODEL
6 N68 DUSSOURD (J L). Investigation of pulsations in the boiler feed systems of a central power station. (J basic eng, Trans, ASME series D. 90;1968;607-19).

D8,D4h5-ZK-VF55-T5-C-0C-04-0z2-zS-z1:95,PB
STEAM GENERATOR, WATER TUBE, POWER UTILITY, CAPACITY 550000 LB/HR, RADIANT HEAT TRANSFER, PULVERISED COAL, MULTI-TIP CORNER BURNER, TWO BURNERS, TANGENTIAL FIRING, NATURAL DRAUGHT, CONVERSION, NATURAL GAS FUEL

7 N70 SNELL (P A) and CROSSWELL (P J). Conversion of a power station water tube boiler to natural gas firing. (J Inst Fuel. 43; 1970; 248–51).

D8,D4h5–ZK–Zb–M;45
STEAM GENERATOR, WATER TUBE, POWER UTILITY, SUPERHEATER, OIL FIRED, OVERHEATING

8 N70 HOLLAND (N H). Discussion on high-temperature corrosion investigations on an oil-fired boiler at Marchwood power station. (J Inst fuel. 43;1970;97–103).

D8,D4h5–(F+P)–ZB–XP–VD5–UQ–9P2–0u
STEAM GENERATOR, WATER TUBE, FIN PAK, HOT WATER SUPPLY LONGITUDINAL WATER FLOW, CAPACITY 5000 LB/HR MEDIUM DESIGN PRESSURE, TWO GAS PASS, FINNED TUBE

9 N70 CLONSAST. (Steam heat engin. 39;1970;36).

D8,D4h5–(R+H)–VD85–UQ–C–985–zzsm6—p3–m1
STEAM GENERATOR, WATER TUBE, RUSTON AND HORNSBY, CAPACITY 8500 LB/HR, MEDIUM DESIGN PRESSURE, COAL FUEL WET BACK, RAM TYPE STOKER, SCROLL TYPE GRIT ARRESTER, AUTOMATIC TEMPERATURE CONTROL, MANUAL ASH CLEANING

10 N68 WHAT IS the cost of a coal fired plant? (Eng boiler house rev. 83; 1968;1757).

D8,D4h5–(V+P)–ZB–VK580—8500–UR–UK80–PY(M→JB)
STEAM GENERATOR, WATER TUBE, VEKOS POWER MASTER, HOT WATER SUPPLY, CAPACITY 580 to 8500 KW, HIGH DESIGN PRESSURE, EFFICIENCY 80 PER CENT, FUEL CHANGE, OIL TO WOOD WASTE

11 N70 OIL-WOODWASTE FIRED boiler developed by G W B. (Steam heat eng. 40;1970;26–9).

91 Bibliographical References

1 Sec 21 NEELAMEGHAN (A) and GOPINATH (M A). Grouping of quasi-isolates. (Annual seminar, (DRTC). 4;1966;Paper K).

2 Sec 4 —— and —— Production engineering of boiler: Depth classification (Annual seminar, (DRTC). 3;1965;Paper L).

3 Sec 1 ——, —— and DENTON (P H). Motor vehicle production: Depth classification: Demonstration. (Lib sc. 4;1967;Paper H).

4 Sec 24 —— and SANGAMESWARAN (S V). Food technology: Depth classification version of CC. (Lib sc. 7;1970; Paper L, Sec 7, P 264–6).

5 Sec 24 RANGANATHAN (S R). Common property isolates. (An lib sc. 7;1960;1–12).

6 Sec 1 21 ——. Design of depth classification: Methodology (Lib sc. 1;1964; Paper A).