

FOREIGN LANGUAGE SERIES

No. 4

F L A T R O O F S

a selected bibliography, 1949-1963,
with notes

compiled by W.H. Ransom

BFR

THE NATIONAL SWEDISH COUNCIL FOR BUILDING RESEARCH
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F L A T R O O F S

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compiled by W.H. Ransom,
Building Research Station, Garston, Watford, Herts

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The National Swedish Council for Building Research: Foreign Language
Series No. 4

Flat Roofs

1949-1963

1949

1. Copper sheet and strip for roofing:
BRITISH STANDARDS INSTITUTION: BS 1569:
London, the Institution, 1949.

The standard covers copper sheet and strip in thickness up to and including 18 SWG and in widths up to and including 48 in. It specifies quality of material, manufacture, finish and dimensions.

2. The design of flat concrete roofs in relation to thermal effects:
BUILDING RESEARCH STATION DIGEST NO. 12:
Garston, the Station, 1949.

The Digest discusses the main points to be taken into account when designing flat concrete roofs to reduce thermal movement and to conserve heat and avoid condensation.

3. Flat roof construction:
COMMONWEALTH EXPERIMENTAL BUILDING STATION, AUSTRALIA: TECHNICAL RECORD NO. 21:
Chatswood, the Station, 1949.

Some notes on the construction of flat roofs on small houses giving general comment on existing practice but not based on any test work.

4. Bituminous felt roofing:
COMMONWEALTH EXPERIMENTAL BUILDING STATION, AUSTRALIA: TECHNICAL RECORD NO. 23:
Chatswood, the Station, 1949.

Notes on the methods of laying bituminous felt roofing and the most suitable maintenance procedures as practised by roofing contractors.

5. Roofs: ventilation and insulation:
COMMONWEALTH EXPERIMENTAL BUILDING STATION, AUSTRALIA: NOTES ON SCIENCE OF BUILDING NO. 3:
Chatswood, the Station, 1949.

The effects of solar radiation on roofs are outlined and suggestions are made for the improvement of roof design and construction. The note is mainly concerned with pitched roofs.

1950

6. Constructional pathology - the maintenance of flat roofs: / in French /:
ANON:
Batir, 1950, 1 (9), 47-50.
7. Weather protection of flat roofs and parapets:
F.G. BONE:
Building Topics, 1950, 5 (1), 16-19.

The design and construction of flat roofs with their associated parapets is detailed. Special reference is made to the need to prevent water penetration and to the properties and qualities of brickwork, concrete, wood-wool slabs and asbestos-cement.
8. Wrought aluminium and aluminium alloys. Sheet and strip:
BRITISH STANDARDS INSTITUTION: BS 1470:
London, the Institution, 1950.

Specifies requirements for sheet up to, and including, 0.252 in. thick and strip up to, and including, 0.192 in. thick. It includes clauses relating to the chemical composition and mechanical properties.
9. Roof spray for reduction in transmitted solar radiation:
G.E. SUTTON:
Heating, Piping and Air-Conditioning, 1950, 22 (9), 131-137.
10. Concrete roofs designed as industrial floors: / in Dutch /:
J.F. WILDT:
Cement, 1950, (19, 20), 445-449.

1951

11. Flat roof construction: / in Dutch /:
ANON:
Bouwbedrijf en Openbare Werken, 1951, 19th April.
12. = 37a.
13. Aluminium roofing:
E. H. LAITHWAITE:
Plumbing Trades Journal, 1951, 30 (11), 46-50.

Methods of roofing and flashing with super-purity aluminium sheeting are described in relation to the special constructional techniques involved.
14. Compact roofs: / in Norwegian with English summary /:
K.K. PRESTRUD:
Norges Byggforskningsinstitutt, Rapport Nr. 4.
Oslo, J. Grundt Tanum Forlag, 1951.

Flat compact roofs have been used in Norway on many types of buildings. These roofs, unfortunately, have often been damaged.

1951 (contd.)

- (14) The experiences obtained, and the conclusions drawn from studies made by the Building Research Department, are presented in this publication. Test specimens were bored or cut from both satisfactory and defective roofs. After a general discussion of roofing and insulation, lightweight concrete insulation without ventilation and insulation with wood-wool slabs, cork and fibre-boards are treated. Mention is made of special constructions, including unventilated concrete roofs, lightweight concrete roofs, and ventilated compact roofs. Fourteen rules for the construction of such roofs are itemized in conclusion.

1952

15. Evaporative cooling of a residential roof:
R.A. BACON and W.E. LONG:
Heating and Ventilating, 1952, 49 (11), 79-82.
16. Mastic asphalt roofing:
BRITISH STANDARDS INSTITUTION: BRITISH STANDARD CODE OF PRACTICE CP 144.201:
London, the Institution, 1952.

This Code gives specifications for mastic asphalt and for the accessory materials used with it. Recommendations are included on the preparation of substructures, on the thickness and number of coats of asphalt required, on methods of protection from solar radiation, and on the technique of laying the mastic asphalt.

17. Loading:
BRITISH STANDARDS INSTITUTION: BRITISH STANDARD CODE OF PRACTICE CP 3 CHAPTER 1:
London, the Institution, 1952.

This Code recommends the dead and imposed loadings, including wind loadings, to be assumed in the structural design of buildings.

18. Code of best practice for the asphaltting of roofs: / in Hebrew /:
BUILDING AND TECHNIQUES RESEARCH INSTITUTE:
Tel-Aviv, the Institute, 1952.

Specifications for the usual practice in Israel housing buildings.

19. How have our flat roofs turned out?: / in Swedish /:
R. HANSON:
Byggnästaren, 1952, 3 (6), 118-128.
20. Practical examples of waterproofing flat roofs: / in French /:
G.E. VARLAN:
Institut Technique du Bâtiment et des Travaux Publics. Annales
1952, 5 (51), 310-328.

1952 (contd.)

21. A study of the effect of different wall and roof materials of buildings on indoor thermal conditions:
K. SUBRAHMANYAN and N. MAJUMDAR:
Journal Scientific and Industrial Research, India 1952, 11A (9), 402-410.
22. Principles affecting insulated built-up roofs:
C.E. LUND and R.M. GRANUM:
University of Minnesota, Institute of Technology, Engineering Experimental Station Bulletin No. 34.
Minneapolis, the University, 1952.

1953

23. Fully supported aluminium roof coverings:
ALUMINIUM DEVELOPMENT ASSOCIATION, APPLICATION BROCHURE NO. 9:
London, the Association, 1953.
- An illustrated booklet for the practising plumber and builder on the installation of aluminium as a fully supported roof covering. It includes notes on the durability and physical properties of aluminium, systems of roof covering and work on site.
24. Precast units for floors and roofs:
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, AUSTRALIA:
DIVISION OF BUILDING RESEARCH: Library Bibliography No. 19.
Highett, the Organization, 1953.
25. Tests on Fural roof sheeting:
COMMONWEALTH EXPERIMENTAL BUILDING STATION, AUSTRALIA: TECHNICAL RECORD NO. 125:
Chatswood, the Station, 1953.
- Results are given of wind driven rain tests to determine the resistance to penetration of water at the laps. Roof slopes as low as 5° were examined.
26. Classification of cracks in buildings: / in Hebrew with English abstract /:
H. NEUMANN:
Israel Institute of Technology. In the Field of Building No. 3.
Haifa, the Institute, 1953.
- Contains a chapter dealing with the thermal expansion of flat roofs.
27. The sealing of flat roofs: / in German /:
K. LUFISKY:
Bauplanung und Bautechnik, 1953, 7 (2), 69-74.
28. Flat slab roofs and floors:
E.A. NADIRSHAH and -. MOHILE:
Indian Concrete Journal, 1953, 27 (12), 452.

1953 (contd.)

29. Outline of plant processes in manufacture of roofing:
K.A. RAMSAY:
Canadian Mining and Metallurgical Bulletin, 1953, 46 (500)
December, 757-759.

Methods of supplying roofing materials capable of withstanding Canadian climate for periods up to and in excess of 20 years; use of asphalt for coating and addition of mineral stabilizers.

30. Cracking under reinforced concrete flat roofs: / in German /:
P. THOMAS:
Beton.-Zement-Markt, 1953, 3 (15, 16), 217-221.
31. The Fural light metal roof: / in German /:
W. WEISER:
Heraklikh Rundschau, 1953, (22), 10-14.

1954

32. Roofing granules; annotated bibliography:
COMMONWEALTH SCIENTIFIC INDUSTRIAL RESEARCH ORGANIZATION, AUSTRALIA:
DIVISION OF BUILDING RESEARCH: Library Bibliography No. 17.
Highett, the Organization, 1954.
33. Failure of an aluminium roofing-foil:
L.M. BLAND:
Department of Supply, Australia. Aeronautical Research Laboratories,
Technical Memo MET. 158.
1954.

A sample of aluminium roofing-foil that had failed in service was found to be metallurgically sound. The failure was attributed to the unsuitability of the particular application, viz. attachment with bitumen to a roof of relatively steep slope.

34. Multi-layer flat roofs: / in German /:
A.W. RICK:
Beton.-Zement-Markt, 1954, 4 (15, 16), 233-235.

Thermal conditions of a flat multi-layer roof capable of taking foot traffic.

35. The new Aluman batten-type roof:
M. SPESCHA:
Light Metals Bulletin, 1954, 16 (21), 922.

Details given of a proprietary strip roofing.

36. The low-pitched roof: / in German /:
P. THOMAS:
Baumeister, 1954, 51 (6), 2-3.

1954 (contd.)

37. Asphalt emulsions as protective coatings:

C.C. WEEKS:

Chemistry in Canada, 1954, 6 (10), October, 33-36.

Discussion of the nature and properties of asphalt and the properties of static asphalt emulsion as a protective coating.

- 37a. Felt-covered roofs - glued double coverings: / in Swedish / :

R. HANSON:

Statens nämnd för Byggnadsforskning, Broschyr No. 7.
Stockholm, the Institute, 1954.

1955

38. Roof types available in Australia:

ANON:

Architecture and arts and the modern home, 1955, (20) April, 33.

The various types of roof available in Australia are tabulated with notes on insulating materials.

39. Repairing cracks in asphalt roofing:

ANON:

Building and Construction, Australia, 1955, 30 (154) January 5.

A note on the repair of cracks in mastic asphalt with bitumen emulsion and hessian.

40. Flat roofing problems:

ANON:

Building Progress, 1955, 20 (1) January, 26.

A summary of some of the investigations of the Division of Building Research, Commonwealth Scientific and Industrial Research Organization, Australia, on flat roofing problems.

41. Hail resistance of roofs:

ANON:

South African Council for Scientific and Industrial Research,
Research Review, 1955, 5 (2), 55-56.

42. Skill, a controversial problem: watertight roof terraces with suitable thermal insulation but capable of taking foot traffic:

/ in German /:

E. BERENDT:

Boden Wand und Decke, 1955, (11), 345-348.

Correct design and execution of flat roofs including correct mortar preparation, adequate jointing and the use of suitable mixes.

1955 (contd.)

43. Domestic flat roof construction:
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION:
DIVISION OF BUILDING RESEARCH AND DIVISION OF FOREST PRODUCTS,
AUSTRALIA:
Highett, the Organization, 1955.
- Notes giving tentative recommendations for rafter sizes and construction of built-up bituminous membrane for domestic flat roofs. This note has been revised in 1957 and 1960.
44. Thermal insulation of roofs: / in German /:
N. GUNGEWELTER:
Bitumen, Teere, Asphalte, Peche und Verwandtestoffe, 1955, 6, 165-166.
45. Roof coatings based on brown coal-tar oils:
E. GUNDERMANN:
Chemische Technik, 1955, 7, 20-26.
- The characteristics are compared of roof coatings based on brown coal-tar oil.
46. Flat and low-pitch roofs: / in German /:
A.W. RICK:
Bauamt und Gemeindebau, 1955, 28 (12), 358-359.
47. Insulation of flat slab roofs: / in Dutch /:
R.V. van der SCHAAR:
Bouw, 1955, 10 (11), 202-204.
48. Roof decks and built-up roofing:
U.S. BUILDING RESEARCH INSTITUTE: TECHNICAL REPRINT NO. 1:
Washington, the Institute, 1955.
- Discusses the ways in which malpractices in design, construction, maintenance and use can cause roof failures.
49. Periodic heat flow through roofs:
D.J. VILD, M.L. ERICKSON, G.V. PARMELEE and A.N. CERAY:
Heating, Piping and Air Conditioning, 1955, 27 (7), 145-151.
- Time lags and rate of heat flow are shown for a typical three-layer roof section. Comparison of test results with exact mathematical solutions are made.

1956

50. Principles and developments of built-up roofs:
M.F. SMITH:
/ First / Annual Conference of Canadian Technical Asphalt Association for the year 1956, Proceedings, 48-55.
- A very general description of the elements of a roofing system and the advantages of asphalt over competitive materials.

51. Bituminous roofing felts: their use in flat roof construction in tropical regions:

BUILDING RESEARCH STATION: COLONIAL BUILDING NOTES NO. 38:
Garston, the Station, 1956.

Deals with the constituents and classification of roofing felts. The causes of blistering, pitting, folding, rotting, crazing and tearing of felts are described. Essential design considerations for a roof deck and its associated details at eaves, verges, flashings, abutments and movement joints are discussed and illustrated.

The Note which is based on the results of tropical surveys, concludes with information on the ways in which felt can be protected from sunlight and heat and on suitable techniques for laying and maintenance of felts.

52. Thermal insulation measures: / in German /:

W. CAEMMERER:
Bauwirtschaft, 1956, 10 (30), 891-893.

The design of thermal insulation for solid flat roofs.

53. Humidity in flat and low-pitch roofs: / in French /:

CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT: CAHIER NO. 259:
Paris, the Centre, 1956.

54. Structural flat roofs: building rules, building faults: / in German /:

F. EICHLER:
Berlin, Verlag Technik, 1956.

55. Comparison of the composition of walls and floors - solid flat roofs:

R. von HALASZ:
Bauwelt, 1956, 47 (22), 519.

Details to be taken into account in the design of solid flat roofs.

56. Solid flat roofs for blocks of flats - proposals for the rational design of floors: / in German /:

R. von HALASZ:
Boden, Wand und Decke, 1956, (9), 258.

Illustrations of several roof constructions of proven reliability and proposals for insulation for ring beams to avoid thermal bridges.

57. The 'Meerkamp' flat roof: / in German /:

W. NEUHÖFER:
Baumeister, 1956, 17 (10), 409-413.

Roof made with a special concrete resistant to heat and frost and free from cracking.

1956 (contd.)

58. Flat roofs in summer:
A.C. PALLOTT:
Heating and Ventilating Engineer, 1956, 30 (352), 163-165.
- Values are tabulated for incident solar radiation on a horizontal plane and for heat transfer through flat roofs of different construction. A lightweight roof with a white surface excludes heat better than an insulated roof with a black surface.
59. Thermal movement of flat slab roofs: / in Dutch /:
RATIOBOUW, Report 419:
Rotterdam, the Institute, 1956.
- A study to analyse the physical background of thermal movement of flat roofs and its effect on the supporting walls.
60. Rottinghuis' system of roof construction: / in Dutch /:
H. ROTTINGHUIS:
Bouw, 1956, 11 (30), 638-640.
61. Effect of mineral additives on the durability of coating grade asphalts:
S.H. GREENFELD:
U.S. National Bureau of Standards, BMS Report No. 147.
Washington, U.S. Government Printing Office, 1956.
62. Combined thermal insulation and sealing of flat roofs: / in German /:
H. WALTHER:
Bitumen, Teere, Asphalte, Peche und Verwandtestoffe, 1956, (5), 198-200.
- Note on a method used in the Soviet Union for sealing flat roofs consisting of an insulating layer of bitumen and fly ash.
63. Built-up roofs in the State of Washington: / in German /:
T.M. HAALAND and R.P. DARLINGTON:
Washington State Institute of Technology, Division of Industrial Research. Bulletin 233.
Pullman, the Institute, 1956.

1957

64. The flat roof and its problems: / in German /:
ANON:
Deutsches Dachdecker-Handwerk, 1957, 78 (22), 765-771.
1. Ventilated flat roofs and roof structures. 2. Pitch of flat roofs. 3. Thermal insulation of flat roofs. 4. Resistance of the insulation to foot traffic. 5. Requirements for water-tightness. 6. Survey of flat roofs. 7. Requirements for the sub-structure.

65. Temperatures of bituminous roof-surfaces:

E.R. BALLANTYNE and J.W. SPENCER:
ASTM Bulletin, 1957 (223) July, 69-73.

Temperature measurements made over a period of one year on flat roof surfaces at Highett, Victoria, showed that reductions of 15° F or greater for 10 per cent of the time can be achieved by treating a black bituminous surface with a suitable white reflective coating. In this period the maximum reduction measured was 49° F for the same coating. Temperature reductions obtained with aluminium paints were not as large. It was shown that for a given reflective surface finish, the temperature reductions observed for 10 per cent of the time in one year can be even greater on pitched roofs than on flat roofs.

66. The effect of weed-killer on waterproof coverings: / in French /:

M. BOUTIER:
Institut Technique du Bâtiment et des Travaux Publics, Annales,
1957, 10 (111, 112), 265-274.

67. The design of flat roofs: / in German /:

J. BRANDT:
Boden Wand und Decke, 1957 (11), 336-339.

Roof structures must remain dry. Measures are discussed to ensure this.

68. Mastic asphalt for roofing (limestone aggregate):

BRITISH STANDARDS INSTITUTION: BS 988:
London, the Institution, 1957.

The Standard covers mastic asphalt for roofing composed of ground limestone and coarse aggregate amalgamated with asphaltic cement. It states the required properties of the asphaltic cement, the grading of the limestone and the relative proportions of the constituents of the prepared mastic asphalt.

69. Mastic asphalt for roofing (natural rock asphalt aggregate):

BRITISH STANDARDS INSTITUTION: BS 1162:
London, the Institution, 1957.

Provides for mastic asphalt made from natural rock in which the bitumen content is between 6 and 10 per cent. The percentage of coarse aggregate is specified together with the method of determining its acid solubility. The properties of the flux oil, the asphaltic cement and the composition and hardness of the prepared mastic asphalt are specified.

70. Corrugated aluminium sheets for general purposes:

BRITISH STANDARDS INSTITUTION: BS 2855:
London, the Institution, 1957.

The material, profile, dimensions and finish of two widths - 8/3 in. and 10/3 in. corrugations - are specified.

1957 (contd.)

71. Structural use of reinforced concrete in buildings:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 114:
London, the Institution, 1957.

This Code deals with reinforced concrete design and construction as applied to beams, slabs, columns. It includes floors, roofs and stairs, the recommendations covering materials, strength and permissible stresses in both the reinforcing steel and the concrete.

72. Small concrete roofs for garages or outhouses:
CEMENT AND CONCRETE ASSOCIATION: ADVISORY NOTE NO. 3:
London, the Association, 1957.

An illustrated note dealing with the design of small slabs and lintels, drainage, concrete mixing and placing.

73. Modification of English roofing mastic asphalt for use in southern Victoria:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research, Report No. 02.0-5.
Highett, the Organization, 1957.

A theoretical study to determine the modifications needed to make an English mastic asphalt suitable for use under any measured climatic conditions, the study being based on recently developed rheological properties of asphaltic bitumen and its admixture with fine mineral matter.

74. Applications of thermal insulation to dwellings: / in Dutch /:
A.J.J. DORRENBOOM:
Polytechnisch Tijdschrift, 1957, B (4344), 7826-7876.

75. Physico-chemical researches on the ageing of bitumens and remedial measures against this effect: / in French /:
R. DUBSISAY:
Institut Technique du Bâtiment et des Travaux Publics, Annales, 1957,
10 (111, 112), 275-278.

76. The flat roof and its problems: / in German /:
R. von HALASZ:
Baugewerbe, 1957, 37 (24), 117-120.

77. Flat, compact roofs:
J. HOLMGREN and T. ISAKSEN:
Byggmesteren, 1957, 5 (3), 45-54.

The article is sub-titled: "Ventilation of thermal insulation. The more important results and conclusions from the studies of experimental houses and actual roofs". These studies have been in progress since 1948. The experimental houses in question are at The Technical University of Norway; The actual roofs studied have been on houses in Trøndelag and Eastern Norway. The purpose was to ascertain why such roofs are damaged and deteriorated,

1957 (contd.)

- (77) and to prepare recommendations for good design. Results of the studies are presented, and ventilating systems and paper roofings are discussed. The collective results of all the studies are used to draw a number of conclusions about proper design of flat, compact roofs. (In conjunction with the article there is a contribution by architect Rognlien about moisture in roofs.)
78. Roofing:
E.D. MILLS:
Architectural Design, 1957, 27 (8), 257-279.
79. Application of mastic asphalt roofing:
THE NATURAL ASPHALT MINE OWNERS AND MANUFACTURERS COUNCIL:
London, the Council, 1957.
- A booklet illustrating the principles of good practice in the application of mastic asphalt to roofwork.
80. Thermal variations in waterproof roof coverings: / in French /:
A. POISSON:
Institut Technique du Bâtiment et des Travaux Publics, Annales, 1957, 10 (111, 112), 249-264.
81. Flat roofs - an unfortunate development? / in Norwegian /:
R. RASMUSSEN:
Byggmesteren, 1957, (10), 8-10.
- The correct choice of construction and design.
82. Solid flat roof construction: / in German /:
R. von HALASZ:
Verband der Dachpappen Industrie.
Wiesbaden, the Association, 1957.
- Three types of flat roofs are classified according to use, to bearing capacity and to the type of ventilation.
83. Measurements on materials and buildings: / in Dutch /:
A.C. VERHOEVEN:
Polytechnisch Tijdschrift, 1957, B (39, 40), 7106-7136.

1958

84. Minimum standard requirements for precast concrete floor and roof units (ACI 711-58):
AMERICAN CONCRETE INSTITUTE COMMITTEE 711:
American Concrete Institute Journal, 1958, 30 (1), 83-94.
85. Flat roofs: / in German /:
ANON:
Bauwelt, 1958, 49 (49), 1194-1197.

1958 (contd.)

86. New insulating materials - with special reference to roofs:
/ in German /:

ANON:

Bauwirtschaft, 1958, 12 (11), 232.

87. Copper, bitumen and glass fibre in one roofing material:

ANON:

Building Materials Components and Equipment, 1958, 18 (11), 391.

The roof construction described and illustrated is obtained by firmly laminating together copper sheeting and glass-fibre based bitumen underlay.

88. Directives for the design of aluminium roofs: / in German /:

ANON:

Deutsches Dachdecker-Handwerk, 1958, 79 (21), 759-766.

89. Asbestos-cement for roofing and cladding:

ANON:

Roofing Contractor, 1958, 52 (9), 218-23.

The article deals with the design of asbestos-cement roof decking and with the fixing and durability of asbestos-cement sheets.

90. Discussion of paper on "Temperatures of bituminous roof surfaces - E.R. Ballantyne and J.W. Spencer":

D.G. STEPHENSON:

American Society for Testing and Materials, Bulletin, 1958, (228) February, 67-70.

91. Condensation and the design of factory roofs:

BUILDING RESEARCH STATION DIGEST NO. 117:

London, H.M.S.O., 1958.

The troublesome aspect of condensation in factory roofs in conditions of high humidity is discussed and suggestions made to avoid or lessen risks in different kinds of roof construction. Improving insulation does not necessarily reduce condensation risks; much depends on how and where the improvement is applied.

92. Condensation in sheeted roofs:

A.W. PRATT:

Building Research Station, National Building Studies Research Paper No. 23.

London, H.M.S.O., 1958.

Describes quantitatively the mechanism of roof condensation and shows how the amount of moisture condensing can be calculated in practice. An account is given of pilot-scale experiments on typical factory roof constructions and of field investigations carried out in occupied metal bungalows.

93. Pliability testing of bituminous coated roofing felts:
E.R. BALLANTYNE and K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization, Australia.
Division of Building Research. Report No. 02.1-6.
Highett, the Organization, 1958.

The influence of several factors on the results of pliability tests in which strips of bituminous coated roofing felt are wrapped around portion of a cylindrical surface has been investigated. Under any given conditions of test the property of the felt having the greatest effect on the proportion of failures is the thickness, the number of failures increasing as the thickness increases. The properties of the saturated base felt and of the bitumen also influence the results.

A test described by the American Society for Testing Materials when slightly modified was found to be satisfactory for assessing pliability.

94. Addition of inorganic fillers to bituminous coatings for roofing: Part 2. Moisture permeability of bituminous coatings and roofing felts:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization, Australia,
Division of Building Research. Report 02.5-6.
Highett, the Organization, 1958.

The mechanism of moisture permeation of organic polymers is briefly discussed and it is indicated that results reported for a blown asphaltic bitumen conform to current theory.

Measurements confirm this and also show that the addition of inorganic filler up to an effective volume concentration of 0.7 decreases the moisture permeability through thin films of bitumen. Moisture permeance of proprietary coated roofing felts is also examined and it is shown that this process is affected by some anomaly such as the presence of micro holes in the coating.

95. Addition of inorganic fillers to bituminous coatings for roofing: Part 1. A general survey:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization, Australia.
Division of Building Research. Report 02.5-3.
Highett, the Organization, 1958.

Selected literature on the effects of adding inorganic powders to bitumens is discussed and proposals for further work given.

96. Weathering of sprayed vinyl coatings:
E.R. BALLANTYNE and J.W. SPENCER:
Commonwealth Scientific and Industrial Research Organization, Australia.
Division of Building Research. Report No. 04.2-1.
Highett, the Organization, 1958.

Rain penetration and tensile tests have been performed on different formulations and thicknesses of sprayed vinyl coatings after exposure to natural weather for periods of up to two years. In the rain penetration tests, coatings that were initially satisfactory showed no deterioration in performance, but a continuing decrease in the percentage elongation at failure was observed in the tensile tests.

1958 (contd.)

97. Condensation under self-supporting aluminium roof coverings:
/ in French /:
M. CROISSET:
Centre Scientifique et Technique du Bâtiment, Cahiers, 1958, 31 (259),
6-15.
98. Solid multilayer constructions and flat roofs: / in German /:
F. EICHLER:
Bauwirtschaft, 1958, 12 (17), 359-365.
99. Solid flat roofs in dwelling constructions: / in German /:
R. von HALASZ:
Deutsche Bauzeitschrift, 1958, 6 (8), 899.
100. Moisture calculations for external walls and roofs: / in Swedish /:
R. HANSON:
Byggnästaren, 1958, (B.3), 64-68.
101. Floor slabs and flat roofs for housing projects: / in Hebrew with
English summary /:
S. ROSENHAUPT and L. WYLER:
Israel Institute of Technology, Building Research Station.
In the Field of Building Bulletin No. 54.
Haifa, the Institute, 1958.

A review of the existing structural methods for floors and flat roofs.

102. Lead flashings, weatherings and roofings:
LEAD DEVELOPMENT ASSOCIATION:
London, the Association, 1958.

An illustrated booklet dealing with the properties of lead sheet, coverings, flashings and weatherings for both pitched and flat roofs. Design and constructional details are fully illustrated.

103. Efficient thermal insulation of top storeys and flat roofs:
/ in German /:
T. MEYER:
Bau-Markt, 1958, 57 (5), 123-126.

104. Result of the Hatfield roofs enquiry:
MINISTRY OF HOUSING AND LOCAL GOVERNMENT:
London, H.M.S.O., 1958.

A summary and part abridgement of the report to the Minister of Housing and Local Government of the inquiry into the cause of the damage to roofs at Hatfield during a gale in November 1957.

105. Ventilation of insulation under asphalt roofs:
NATURAL ASPHALTE MINE-OWNERS AND MANUFACTURERS COUNCIL: INFORMATION SHEET 1:
London, the Council, 1958.

Deals with the design of ventilators to remove entrapped moisture in roofs.

1958 (contd.)

106. Thermal movement of flat slab-like roofs II: / in Dutch /:
RATIOBOUW: Report 499:
Rotterdam, the Institute, 1958.

A study to analyse the physical background of thermal movement of flat roofs and its effect on the supporting walls.

107. The flat roof: / in German /:
A.W. RICK:
Heidelberg. Strassenbau, Chemie und Technik Verlagsgesellschaft, 1958.

108. Wind loadings on flat-roofed buildings:
C. SALTER:
Engineering, 1958, 186 (4832), 508-510.

109. Flat roofs: / in Dutch /:
R.V. van der SCHAAR:
Bouw, 1958, 13 (26), 648-649.

An English translation is available by L.M.L. Booth as Building Research Station, Watford, Library Communication No. 1068.

1959

110. Flat roof construction: / in German /:
ANON:
Baumeister, 1959, 56 (10), 73-76.

111. Klip-lok-the new impervious steel deck:
ANON:
Building and Construction, Australia, 1959, 36 (1788), 3-5.

The roof decking described and illustrated is made from galvanized iron sheet steel formed into a ribbed shape 12 ins. wide with ribs $1\frac{1}{2}$ in. deep.

The roof may be fixed with the ribs down to provide a deck for built up roofing or fixed in the reverse manner without additional covering.

112. The flat roof: / in German /:
ANON:
Dachdeckermeister, 1959, 12 (10), 1-32.

Discusses the use of vapour barriers and ventilation; experiences with coal tar, bituminous paper and glass wool; various insulating materials including foamed plastics and peat.

113. Discussions on flat roofs: / in German /:
ANON:
Deutsches Dachdecker-Handwerk, 1959, 80 (7), 223.

Opinions of the designer, builder and research worker on flat roof construction; flat roof practices in Germany and other countries.

1959 (contd.)

114. Flat roofs and leaks:

E.R. BALLANTYNE:

Building and Decorating Materials, 1959, 1 (2), 28.

A discussion of recent trends in flat roofing in Australia with particular attention to details where poor design may lead to leaks.

115. Hot-dipped galvanized corrugated steel sheets:

BRITISH STANDARDS INSTITUTION: BS 3083:

London, the Institution, 1959.

The Standard covers the materials weight of zinc coating, the coating adherence of the zinc, tolerances, profiles and dimensions of hot-dipped galvanized corrugated steel sheets for general purposes.

116. Wind effects on roofs:

BUILDING RESEARCH STATION DIGEST NO. 122:

London, H.M.S.O., 1959.

The Digest considers the characteristics of wind and the effect of buildings upon wind flow. The external and internal pressures of wind upon a roof are considered in relation to the pitch of the roof and the direction of the wind relative to the building. The strength and stability of monopitch roofs, lightweight house roofs of low pitch and some special roofs are dealt with.

117. Deterioration of flat roof coverings: experience from field investigations:

R. HANSON:

Building Research and Documentation. Contributions and Discussions at the First C.I.B. Congress, Rotterdam, 1959, Subject 6, Flat Roofs, 334-346.

An account of a general survey of older roofs followed by more detailed studies made on roofing materials. The method of investigation followed, the common mistakes made in roofing construction, and the ways of avoiding such mistakes are described.

118. Moisture migration and removal of moisture by ventilation from porous materials used in flat roofs:

T. ISAKSEN:

Building Research and Documentation. Contribution and Discussions at the First C.I.B. Congress, Rotterdam, 1959, Subject 6, Flat Roofs, 316-33.

The article gives the principal results of the Norwegian investigations into the removal of moisture from flat roofs.

119. Changes in bituminous roofing felts associated with changes in moisture content:

K.G. MARTIN:

Commonwealth Scientific and Industrial Research Organization, Australia. Division of Building Research. Technical Paper No. 8. Highett, the Organization, 1959.

Changes in dimensions of roofing felts of different raw felt type and stage of manufacture have been measured on specimens fixed with various adhesives on an exposed near-flat roof. Shrinkages of up to 23 per cent have been recorded. The shrinkage is associated with repeated wetting and drying of the bonded felt, and is accentuated by the usual conditions of high surface temperatures during drying and low surface temperatures during wetting. A laboratory shrinkage test has been developed which correlates with the observed performance of various bituminous saturated felts.

A method given by the American Society for Testing Materials for determining water absorption of bituminous saturated felts has been modified for application to coated felts. A blister test for coated felts is also proposed for inclusion in Australian standard specifications.

120. Copper roofing:

COPPER DEVELOPMENT ASSOCIATION: PUBLICATION NO. 57:
London, the Association, 1959.

An illustrated handbook giving practical details of the way in which copper sheet and strip are used for roof coverings, flashings, weatherings, gutters, damp proof courses and expansion joints.

121. Asphaltic materials for the waterproofing of roofs: / in Spanish with English summary /:

G.G. ORTEGA:

Instituto Tecnico de la Construcción y del Cemento, No. 192. Madrid, the Institute, 1959.

122. Vapour barriers in flat roof construction: / in German /:

K. MORITZ:

Bitumen, Teere, Asphalte. Peche und Verwandtestoffe, 1959, 10 (3), 98-99.

123. Detailed design of flat roofs for Canada:

R.F. LEGGET:

National Research Council, Canada. Division of Building Research, Technical Note.

Ottawa, the Council, 1959.

Describes the roof construction of two apartment buildings in Ottawa. One vented loft type building as normally recommended by the Division of Building Research has experienced considerable trouble from condensation.

124. Ventilated and unventilated flat compact roofs:

J. HOLMGREN and T. ISAKSEN:

Norges Byggeforskningsinstitutt, Rapport 27.

Oslo, the Institute, 1959.

Much damage has been observed on flat roofs in Norway, particularly on those built during the 1930's. In 1948, experimental studies on two experimental houses with flat roofs were started in Trondheim. The Norwegian Building Research Institute also compiled the experiences with existing flat roofs in different parts of Norway. Experimental data and experience are summarized in this report. The conclusion is drawn that for the Norwegian climate such roofs must be sandwich-designed, with a ventilated hollow space between the insulation and the roofing.

125. Thermal cracks in buildings: / in Hebrew with English summary /:

S. ROSENHAUPT and L. ROSENTHAL:

"Handassa ve-Adrikhalut", 1959, 18 (2-3) February-March, 50-52.

Dealing with the tensile forces in walls caused by the thermal expansion of flat roofs.

126. Flat roofs: / in German /:

W. SCHAUPP:

Heraklith Rundschau, 1959, 48 (9), 2-22.

An English translation by G.L. Cairns is available as Building Research Station, Watford, Library Communication LC 1051.

127. Modern roof coverings: / in German /:

H. SCHIERLING:

Bau-Markt, 1959, 58 (6), 160-161.

128. Moisture risks of solid non-ventilated roof structures as a result of moisture diffusion and accumulation of condensation: / in German /:

H.B. SCHULTZ:

Baumeister-Zeitung, 1959, 62 (11), 10, 12, 14-15.

129. Model experiments on diagonally interconnected flat roofs and domes:

P. SMITH:

Architectural Science Review, 1959, 2 (1), 33-38.

130. The thermal insulation of a single shell flat roof: / in German /:

H. THIEBLE:

Deutsche Bauzeitschrift, 1959, 7 (9), 1082, 1084, 1086.

131. Wind effects on roofs with particular reference to flat roofs of lightweight construction:

F.G. THOMAS:

Building Research and Documentation. Contributions and Discussions at the First C.I.B. Congress, Rotterdam, 1959, Subject 6, Flat Roofs, 347-356.

This article covers the same ground as item No. 116 but also includes a section on the instruments used to measure wind speed.

1959 (contd.)

132. The use of ventilation in building constructions: / in Dutch /:
A.C. VERHOEVEN:
Bouwkundig Weekblad, Architectura, 1959, 456-458.
133. The problems of solid flat roofs: / in German /:
H. WAGNER:
Bautrichter, 1959, (7), 169-174.
134. Coverings for water-cooled flat roofs: / in German /:
H. WALTHER:
Bitumen, Teere, Asphalte, Peche und Verwandtestoffe, 1959, 10 (1), 32.
135. The tiled flat roof in Switzerland: / in German /:
H. WALTHER:
Bitumen, Teere, Asphalte, Peche und Verwandtestoffe, 1959, 10 (11), 439-440.
136. Asphalt - versatile partner of concrete:
C.C. WEEKS:
Specifications Associate, 1959, 1 (1), 27-31.
137. The tanked roof: / in German /:
W. ZILKEN:
Deutsches Dachdecker-Handwerk, 1959, 80 (23-24), 882-888.
138. Roofing - types, materials and shapes, 2nd edition: / in German /:
R.M. ZOLLINGER:
Stuttgart, Konradin Verlag Robert Kohlhammer, 1959.

1960

139. Aluminium corrugated and troughed sheeting for roofing and vertical cladding:
ANON:
Aluminium Development Association. Application Brochure No. 14.
London, the Association, 1960.
140. Aluminium roofing and cladding:
M. BRIDGEWATER and H.G. DUNN:
Aluminium Development Association. Symposium on Aluminium in Building. Proceedings, 1960, Paper No. 8.
London, the Association, 1960.

The paper includes notes on the durability of aluminium, its structural properties, resistance to fire and use for thermal insulation. Roofing systems using self-supporting and fully supported sheets are described.

141. Exclusive trade reports on materials and methods: the roof:
ANON:
Australian Architecture Today, 1960, 2 (7) May, 31; (8) June, 33; (9) July, 35.
Gives information on following products; caneite, copper, stramit, klip-lok, tri-lok, aluminium, bituminous treatments, alcap, alsymite, sisalation rondo foil.

1960 (contd.)

142. Physical aspects of the use of poured concrete for flat roof construction: / in German /:
ANON:
Baupraxis, 1960, 12 (7), 28-33.
143. Pulpwood waste utilized in Ontario:
ANON:
Canada Lumberman, 1960, 80 (7), 32-33.

Describes a new method of manufacturing roofing felt using bark and wood slivers produced by a neighbouring pulpmill.
144. Flat roofs today: / in German /:
ANON:
Dachdeckermeister, 1960, 13 (1), 6-8.

Discussion of various flat roof systems with notes on the consequences of incorrect construction.
145. Considerations of the flat roof solution for a modern building:
ANON:
Deutsches Dachdecker-Handwerk, 1960, 81 (15), 617-619.

This describes the thermal insulation of single shell flat roofs with bitumenised wood-fibre insulation slabs.
146. Sheet roof and wall coverings: copper:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 143 PART 4:
London, the Institution, 1960.

This illustrated code deals with copper sheet and strip used as a covering for roofs. Recommendations are made regarding the types of sub-structure, use of underlays, design methods of both the standing seam and common roll systems together with details of the laying techniques involved. Tables of gauges thickness and weights of copper sheets, dimensional details of copper gutters, and information on the properties of copper are given in appendices.
147. Lead:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 143 PART 3:
London, the Institution, 1960.

This illustrated code gives comprehensive guidance on the use of lead sheet for roof covering. Recommendations are made regarding the types of sub-structure, design methods for both the wood-roll and hollow-roll systems and details of the techniques involved during laying. Weights, thickness and the physical properties of lead sheet are shown in appendices.
148. Condensation under impervious roofing:
A.H.Y. BRODERICK:
Builder, 1960, 199 (6131), 943-946.

1960 (contd.)

149. Galvanized corrugated roofing iron:
BUILDING RESEARCH BUREAU OF NEW ZEALAND: BUILDING INFORMATION BULLETIN NO. 9:
Wellington, the Bureau, 1960.

150. Aluminium roofing:
BUILDING RESEARCH STATION: OVERSEAS BUILDING NOTE NO. 69:
Garston, the Station, 1960.

The Note examines the general properties of aluminium and considers its use in different types of roofing - fully supported, self-supporting, proprietary, deck and tile. Appropriate surface finishes are described.

151. Lightweight cellular screeds with asphalt and felt roofing finishes:
P. CABLE:
Roofing Contractor, 1960, 64 (11), 227-232.

The practice of and problems associated with the laying of asphalt and roofing felt over cellular concrete are described. Methods to prevent or minimise blistering are noted.

152. Investigation into moisture content and thermal insulation of eleven flat roof structures:
B.H. VOS and F.G. van SANTE:
Centraal Technisch Instituut T.N.O. and Stichting Ratiobouw, Report No. 8/799/1960.
The Hague, the Institute, 1960.

Roofs of different categories were investigated with insulation above and below the slab, ventilated and unventilated. It was found that the requirements of Netherlands Standard V1068 for the thermal insulation of roofs is often not met and that the moisture content of unventilated roofs was much higher than that assumed in V1068. It was concluded that the only good roofs were ventilated and had insulation above.

153. Low pitched metal roofs: latest developments in metal roofings and fixing technique:
R.P. CHADWICK:
Building and Decorating Materials, 1960, 2 (12) November/December, 22.

154. Bituminous roofs:
E.R. BALLANTYNE and K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization, Australia. Division of Building Research. Building Study No. 1.
Highett, the Organization, 1960.

This publication has been compiled to summarize the results of numerous experimental investigations and inquiries by the Division of Building Research into local and overseas practices. It is concerned with membranes constructed of alternate layers of asphaltic bitumen and some bitumenised fabric, as distinct from asphalt.

155. Analysis of bituminous felts:
N.G. BROWN:
Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research. Report O2.1-8.
Highett, the Organization, 1960.

Methods for the analysis and characterization of the constituents of various types of bituminous felt have been prepared, mainly by modifying those given by the American Society for Testing Materials. Results obtained by using these methods are given for a range of materials available in Australia.

It has been shown that the properties of the base felt may be satisfactorily determined on the desaturated felt obtained from the finished product. The concept of "saturation efficiency" of a bituminous felt has proved useful, and is a measure of the percentage of the maximum saturation capacity of the felt achieved by the manufacturer. A titration method for determining the kerosene number of a base felt has no advantage over the vacuum method normally employed.

Conditioning of felts prior to analysis has been found necessary to avoid errors resulting from variation in their moisture contents.

156. Bitumens for built up roofs. Part 1: specification tests:
K. G. MARTIN:
Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research. Report O2.5-8.
Highett, the Organization, 1960.

Seventeen samples representative of most of the roofing bitumens (coal tar pitches, blown asphaltic bitumens and residual asphaltic bitumens) available in Australia have been examined in the laboratory, and the tests used are discussed as to their usefulness in specifications. Chemical characterization was effected by solvent analysis and chromatographic separation. Mechanical properties were determined by the routine tests, penetration and softening point, and the significance of an improved Fraass breaking point test is discussed. Hardening of bitumens when heated was investigated and an optimum viscosity of application determined. Measured flash point temperatures are compared with calculated maximum temperatures of kettles. The relative merits of the various grades and types of roofing bitumen are discussed.

157. Periodic heat-flow characteristics of simple walls and roofs:
E. DANTER:
Institution of Heating and Ventilating Engineers, Journal, 1960
28 (July), 136-146.

The paper gives, for the simpler types of structure, methods for determining the alternating transmittances and time-lags which are required in the calculation of heat flow under periodically varying conditions.

1960 (contd.)

158. Thermal stresses in solid flat roofs as a result of insulation:
/ in German /:
F. EICHLER:
Berlin, Verlag für Bauwesen, 1960.
159. Built-up roofing in building construction:
FELT ROOFING CONTRACTORS ADVISORY BOARD:
London, the Board, 1960.

An illustrated booklet dealing with the selection and use of bituminous felts on timber, concrete and metal roof decks, and showing many fixing details.
160. Physical aspects of the use of poured concrete for flat roof construction: / in German /:
K. MORITZ:
Beton Herstellung Verwendung, 1960, 10 (11), 532-536.

The difficulties involved in the use of insulating poured concretes - pumice concrete, slag concrete and aerated concrete - are noted.
161. A topical subject: vapour barriers in flat roof construction:
/ in German /:
K. MORITZ:
Boden Wand und Decke, 1960, 6 (9), 344, 346-347.
162. Ventilation and diffusion channels and their function in flat roof construction: / in German /:
K. MORITZ:
Deutsche Bauzeitung, 1960, 65 (7), 378-380.
163. Thermal stresses and thermal insulation in flat roof construction:
/ in German /:
K. MORITZ:
Deutsches Dachdecker-Handwerk, 1960, 81 (14), 543-550.
164. Comment on cancellation of roofing bonds in Canada, on inspection and cut-testing:
I. E. ORTON:
Specifications Associate, 1960, 2 (2), 55.
165. Joints in flat roofs: / in German /:
A. W. RICK:
Bau Markt, 1960, 59 (41), 1852.
166. Roof terraces: insulating and protective layers: / in Swedish /:
H. HANSON:
Statens nämnd för byggnadsforskning. Report No. 62.
Stockholm, the Institute, 1960.

1960 (contd.)

167. Rational roofing: / in Hebrew /:
Y.C. SUHLMANN:
Building and Techniques Research Institute, 62 p.
Tel-Aviv, the Institute, 1960.

Review of the usual roofing practices including cast in-situ reinforced concrete, pitched roofs, flat roof of precast members and a discussion of various insulation materials.

168. The determination of the thermal properties of roof structures:
C. WOOD:
Roofing Contractor, 1960, 11 (61), 34-38.

The thermal conductance and transmittance of various types of asbestos-cement cavity decking with and without insulation are reported.

1961

169. Urethane roofing board:
ANON:
Modern Plastics, 1961, 39 (3), 157.

Describes the use and properties of prefabricated roofing panels consisting of rigid urethane foam cores sandwiched between two mica-faced bitumen felt layers.

170. Condensation problems in modern buildings:
E.T. WESTON:
Paper to Australian Building Research Congress, 1961 (August).
Highett, CSIRO, 1962.

Condensation is discussed in relation to its usual forms of occurrence under Australian conditions. Several cases of condensation damage are reported including interstitial condensation resulting from openings into roof ceiling spaces. Methods of reducing or preventing condensation are presented including reduced liberation of moisture within buildings, ventilation and the use of vapour barriers. It is considered that paint films may prove adequate for controlling condensation under many Australian conditions.

171. Built-up roofing:
M.C. BAKER:
Royal Architectural Institute of Canada, Journal, 1961, 38, 57.

Canadian Building Digest No. 24. A general discussion of factors that affect the design and service life of gravel surfaced built-up roofing of the "hot application" type for flat or nominally flat roofs.

1961 (contd.)

172. Roofing felts (bitumen and fluxed pitch):
BRITISH STANDARDS INSTITUTION: BS 747:
London, the Institution, 1961.

The Standard describes the methods of manufacture of five main classes of roofing felt and specifies the requirements for the constituent materials used.

173. Troughed aluminium building sheet:
BRITISH STANDARDS INSTITUTION: BS 3428:
London, the Institution, 1961.

The material, profiles, dimensions and finish of 5/5 inch, 6/5 inch and 7/5 inch troughs are specified.

174. Aluminium corrugated and troughed:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 143 PART 1:
London, the Institution, 1961.

The Code deals with three main types of aluminium corrugated and troughed sheet used for roofing and cladding. Information given includes the effect on aluminium of contact with other materials, weathering, thermal insulation, fire resistance and condensation. Recommendations deal with minimum pitch, side and end laps and methods of fixing; laying techniques are fully described. Tables of recommended load requirements, diagrams of sheet profiles and tables of the properties of different sections and of weights are given in an appendix.

175. Galvanized corrugated steel:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 143 PART 2:
London, the Institution, 1961.

The Code gives comprehensive recommendations on the use of galvanized corrugated steel sheets for roofing and cladding. It deals with the materials, design, construction and maintenance together with information on weather-tightness, durability, thermal insulation, fire hazards and rainwater drainage. The Code contains illustrations of typical profiles showing side laps, end laps and fixing details. Also included is an appendix on thermal insulation.

176. Bitumen felt roof coverings:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 144.101:
London, the Institution, 1961.

This illustrated Code deals with the laying of built-up bitumen felt roofing on both flat and pitched surfaces of timber, concrete, hollow tiles and beams, wood wool slabs, lightweight concrete, compressed strawboard and asbestos-cement or metal decking. Recommendations are given for the preparation of the base, the selection of the type of felt and the number of layers required for various conditions. Advice is given on the techniques for fixing the felt roofing and on surface finishes.

177. Principles of modern building, Vol. 2. Floors and roofs:
BUILDING RESEARCH STATION:
London, H.M.S.O., 1961.

Chapters 6 and 7 deal with roofs and flat roofs respectively and cover 70 pages of text. The items dealt with include strength and stability; dimensional stability; exclusion of moisture; thermal insulation; fire protection; sound insulation; screeds and coverings; daylighting; roof drainage; durability and maintenance; roof decks.

178. Built-up felt roofs:
BUILDING RESEARCH STATION DIGEST NO. 8 (SECOND SERIES):
London, H.M.S.O., 1961.

The Digest lists the types of roofing felt available and comments on their durability. Sections deal with the choice of felt for roofing, the fire resistance of built-up roofs and with roof construction. The ways in which felt can be fixed to the roof and the preparation for fixing to avoid cracking and blistering of the felt are dealt with in detail; particular attention is given to moisture and thermal movements and to the detrimental effects of rainwater, constructional water and condensation. The Digest concludes with recommendations for roof constructions and for the treatment of defects.

179. A new use of wood rejects in the manufacture of roofing felts:
J.E. CASH:
Pulp and Paper Magazine of Canada, 1961, 62 (2) February.

Describes a project to develop an installation for utilizing wood rejects in the manufacture of roofing felt. This project was completed in 1959 and is now in continuous operation, with good results, using wood rejects in amounts up to 45 per cent of the total furnish.

180. Sizes for gutters and downpipes:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research. Report O2.2-30.
Highett, the Organization, 1961.

Optimum sizes of gutters to cope with rainfall intensities that occur at various frequencies for Australian State capital cities have been calculated. The features of gutter design that influence its flow capacity and the optimum size of downpipe to serve the gutter have been considered. A graph is presented from which the total area of downpipe required to drain roof areas may be determined.

181. Deterioration of bituminous roofing fabrics:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization, Australia.
Division of Building Research. Technical Paper No. 11.
Highett, the Organization, 1961.
- Mildew susceptibility and soil burial tests have been carried out on bituminous fabrics commonly used in the construction of built-up roofs. As a result of the positive findings, inspections of old roofs about Melbourne were made but no evidence of micro-biological deterioration was found. The main factors causing deterioration of roofing fabrics and the relative merits of various membrane systems are discussed.
182. Built-up roofing:
W.J. FREEMAN:
Specifications Associate, 1961, 3 (2) Spring, 26, 28.
- Recommending consultation and inspection service, and giving an inspection procedure.
183. Built-up roofing:
B. GILLESPIE:
Canadian Architect, 1961, 6, October, 76-80.
- Sheets 28 & 29 of the Canadian Architects' Desk File. Describes materials, design and application of built-up roofing.
184. The problem of flat roofs: / in German /:
R. von HALASZ:
Bitumen, Teere, Asphalte, Peche und Verwandtestoffe, 1961, 12 (4), 160-163.
- Discusses cracking due to temperature change, the Berlin regulations, the minimum slope of flat roofs and the ventilation of roof slabs.
185. Plastic flashing:
K.L. HUDSON:
Specifications Associate, 1961, 3, Spring, 67-69.
- Describes the use of vinylidene chloride copolymer for flashings in built-up roofing.
186. Thermal stresses in buildings due to differential expansion of roof and walls: / in Hebrew with English summary /:
S. ROSENHAUPT, A. KAUFMAN and I. ROSENTHAL:
Israel Institute of Technology, Building Research Station, Bulletin. In the Field of Building, No. 82-83.
Haifa, the Institute, 1961.
- Report on the results of theoretical and experimental research of the problem, including observations on site of the performance of different methods of avoiding thermal cracks.

1961 (contd.)

187. Influence of ceiling height on thermal conditions in dwelling houses in Beer Sheba:
B. GIVONI and R. SHALON:
Israel Institute of Technology, Building Research Station,
Research Paper No. 17.
Haifa, the Institute, 1961.
Measurements of indoor climate, data for dwellings of various ceiling height.
188. Aerated concrete as thermal insulation for concrete roofs and flat roofs: / in German /:
J. KOPATSCH:
Deutsche Bauzeitschrift, 1961, 2 (4), 494-496.
189. Repairs to flat roofs: / in German /:
A. KORFF:
Deutsches Dachdecker-Handwerk, 1961, 82 (15), 659-661.
190. Thermal insulation of flat roofs:
K.G. MARTIN:
Building Materials Magazine, 1961, 2 (5), 26.
The basic concepts of thermal insulation are discussed as involved in keeping both the roof deck and the roof membrane as cool as possible in summer. Simple steady state calculations of temperature are given to enable various systems of roof construction to be compared.
191. Review of the durability of roofing bitumens:
K.G. MARTIN:
Institute of Petroleum, Journal, 1961, 47 (454) October, 321-328.
A review has been made of the literature on the durability of bitumens with regard to the performance of bituminous roofs. Oxidation is generally considered to be the most important factor, and particular attention has been given to the laboratory study of this reaction and the development of durability prediction tests.
It is proposed that three separate oxidation tests simulating conditions of application exposure to moisture and air in the dark, and exposure to moisture and air in the light may be developed to assess roofing bitumens. Further chemical investigations of the functional groups of the less viscous fractions is required.
192. Waterproofing a shell roof with aluminium foil:
H.V. MIRCHANDANI, A.K. BHOWMIK and J.S. SHARMA:
Indian Concrete Journal, 1961, 35 (October), 388-389.

1961 (contd.)

193. Waterproofing of R.C.C. flat roofs:
H.V. MIRCHANDANI, J.S. SHARMA and V.K. GAIN:
Institution of Engineers (Poona centre), Journal, 1961, 3, 14 p.
This article shows how the performance of a flat reinforced concrete roof is influenced by the quality of the concrete, the climate and the use of waterproofing treatments.
194. Physical and structural principles of flat roof construction:
/ in German /:
A.W. RICK:
Bauamt und Gemeindebau, 1961, 34 (1), 20-24.
- 194a. Measurement of effect of moisture on heat transfer through insulated flat-roof constructions:
F.J. POWELL and H.E. ROBINSON:
Am. Society for Testing and Materials, 1961, 35-65.

1962.

195. Experience in the use of the ASTM spark-gap tester for asphalt films:
P.M. JONES:
Submitted to American Society for Testing and Materials, May 1962.
Description of tester designed and constructed by the Division of Building Research, and a comparison between this apparatus and the design specified in the ASTM method.
196. Element design guide: roofs, structural flat; general:
ANON:
Architects Journal, 1962, 135 (5), January 31st, 259-276.
A design procedure for the construction of flat roofs containing information on design loads for flat roofs and roof deckings.
197. Element design guide: finishes, flat roofs:
ANON:
Architects Journal, 1962, 135 (17) April 25th, 917-924.
A design procedure for all fully supported roof coverings for roofs with slopes of five degrees or less.
198. Sheet roof and wall coverings: corrugated asbestos-cement:
BRITISH STANDARDS INSTITUTION: CODE OF PRACTICE CP 143 PART 6:
London, the Institution, 1962.
The Code deals with the design and construction of asbestos-cement sheet coverings of various profiles to walls and roofs. Information is included on weather resistance, durability, thermal insulation, fire hazard and maintenance. The Code concludes with an outline of the various profiles with trade names.

199. Thermal insulation of factory buildings:
G.D. NASH:
Building Research Station. Factory Building Studies No. 11.
London, H.M.S.O., 1962.
- Contains data on heat loss and solar heat gain through factory roofs with glazing.
200. Asbestos-cement roofing and other products:
BUILDING RESEARCH STATION: OVERSEAS BUILDING NOTES NO. 82:
Garston, the Station, 1962.
- The Note considers asbestos-cement under the main headings of thermal behaviour, moisture movement and durability. The types of sheet made, their fixing and the application of surface finishes are also described.
201. A brittle point test for low temperature studies of bitumens:
P.M. JONES:
Paper presented at the Annual Meeting of the Canadian Technical Asphalt Association, November 20th, 1962.
- In order to study the low temperature performance of asphalts, improvements have been made to the Institute of Petroleum Specification IP 80/53 for determining the brittle point of bituminous materials. A new procedure for preparing the coated plaques is proposed which enables a film of asphalt of known thickness to be prepared. The apparatus has been mechanized and the spring steel plaque replaced with a clear polyester film. The brittle point unit is cooled at any desired rate using alcohol as a coolant. Studies have been made of effect of film thickness, and rate of cooling upon the brittle point temperature. Study of the effect of overheating a dead-level roofing asphalt is shown to be one of the uses of the instrument.
202. Note on the research undertaken by C.S.T.B. on the problem of the use of lightweight insulation for the insulation of flat roofs:
/ in French /:
CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT:
Paris, the Centre, 1962.
203. Bitumens for built-up roofs: Part 2. Empirical studies of slump:
K.G. MARTIN:
Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research. Report O2.5-9.
Highett, the Organization, 1962.
- The problem of selecting the most suitable grade of bonding bitumen for built-up roof membranes of various slopes is discussed, and investigations of slump by field trials and laboratory tests are described. A guide is given to the selection of suitable bitumens in relation to the various factors that influence slump.

204. Filled bitumen coatings for roofing felts:

K.G. MARTIN:

Commonwealth Scientific and Industrial Research Organization,
Australia. Division of Building Research. Technical Paper No. 12.
Highbett, the Organization, 1962.

The present knowledge concerning addition of inorganic fillers to bitumens is reviewed and results of laboratory and field investigations designed to evaluate a wide range of bituminous coatings for roofing felts are recorded. Considerable attention has been given to problems associated with the absorption and penetration of moisture and the development of blisters in the coating.

205. Information on the use of built-up bituminous flat roofs:

E.H.J. ZIEDELL:

Department of Works, Australia. Building Research Liaison Service,
1962.

In this document an endeavour has been made to present up to date information on efficient practices in the use of built-up bituminous roof coverings in various types of roof construction. A large proportion of the explanatory notes is taken from Commonwealth Scientific and Industrial Research Organization, Division of Building Research, Building Study No. 1, 1960.

206. Cracking in buildings of concrete and brickwork: / in Dutch /:

S.C. von DORSSER:

Cement, 1962, 14 (1), 37-41.

207. Thermal insulation: roofs and problems associated with moisture:

R.M. EDWARDS:

Architects Journal, 1962, 136 (18), 1029-1030.

Some discrepancies between the theoretical calculation of U-values and the observed values of actual heat loss are indicated. Evidence is advanced that they are attributable to the adverse effects of entrapped or absorbed moisture arising from condensation in flat roofs.

208. Asphalt versus coal-tar pitch:

W. FREEMAN:

Specification Associate, 1962, 4 (2) April, 13, 16.

Comparison of water absorption and other properties affecting the application and durability of asphalt and coal-tar pitch in the construction of built-up roofing.

209. Investigations of moisture problems in built-up bituminous roofs:
K.G. MARTIN:
Paper to the International Roofing Contractors Convention, Bad Godesburg, West Germany, July 1962.
- A discussion of the problems of small bubbles in bitumen coatings, shrinkage, puckering and deterioration in top layers of built-up roof membranes and humpback blistering of the membrane in the light of work done at the Division of Building Research, Commonwealth Scientific and Industrial Research Organization, Australia.
210. Roof design and roofing terminology:
M.C. BAKER:
National Research Council of Canada. Division of Building Research. Technical Paper 130.
Ottawa, the Council, 1962.
- A general description of the factors requiring consideration in the design of built-up roofing, and a glossary of commonly used roofing terms. Material prepared as a contribution to a seminar sponsored by the Canadian Army to train works personnel.
211. Construction of compact roofs: / in Norwegian /:
T. ISAKSEN:
Norges Byggforskningsinstitutt, Saertrykk No. 71, 48-57.
Oslo, the Institute, 1962.
- This illustrated article deals with vapour barriers, thermal insulation and ventilating systems. Double-roof types are included. Experience from research on test-laboratories and on common buildings, (mostly industrial), is included and normal defects are also noted.
212. Directives for insulating roofing slabs: / in Dutch /:
RATIOBOUW:
Rotterdam, the Institute, 1962.
213. Provisional requirements and directives for the application of elements used for the thermal insulation of stony flat roof structures:
RATIOBOUW: Report 1179:
Rotterdam, the Institute, 1962.
- The report summarizes the thermal and mechanical requirements and the protection against high humidity needed for insulating materials for roofs in order that the requirements of Netherlands Standard V 1068 should be met. The materials in question are mainly of cement-bound organic fibres but cellular concrete and foamed polystyrene are also included.

1962 (contd.)

214. Experiences with finishes on floors and roofs: / in Dutch /:
R.V. van der SCHAAR:
Bouw, 1962, 17 (39), 1398-1399.
215. Heat insulation of roof terraces:
R. HANSON:
Statens råd för byggnadsforskning, Internal report No. 3:1962.
Stockholm, the Institute, 1962.
- The report considers the applicability of Norwegian research on ventilated flat roofs to Swedish climatic conditions. The detailing of roof ventilators and air intakes was not simple and ventilated roofs are not considered here to be an ideal solution. The use of grooved slabs of expanded cork, of an insulating fill of sintered clay balls and of foamed glass placed above the slab is commented upon.
216. Thermal insulation of slab-like roofs: / in Dutch /:
E. TAMMER:
Missets' Bouwwereld, 1962, 1301-1305.

1963

217. Asbestos-cement slates and sheets:
BRITISH STANDARDS INSTITUTION: BS 690:
London, the Institution, 1963.
- The Standard provides for rectangular slates and unreinforced flat and corrugated sheets both straight and curved. Dimensions and tolerances, composition of materials and permitted colouring matter are considered and notes are given on the use of asbestos-cement for roofing.
218. The function of the cold roof: / in Norwegian /:
E. FINNE:
Byggmesteren, 1963, (3), 61-67.
- Sufficient thermal insulation, vapour barrier and ventilation to prevent the snow melting on roofs. Mathematical solutions based on steady state conditions.
- 218a. Plane tak-forskningen:
I. JANSSON:
Byggnadsvärlden, 1963 (1), 5-9.

219. Paving tiles reduce flat roof temperatures:
K.G. MARTIN:
Building Materials Magazine, 1963, 4 (3), 34-37, 70, 72.
Concrete paving tiles fixed to bituminous roof membranes markedly reduce peak membrane temperatures. When mounted on corner blocks they provide a better system than the more conventional constructions for reducing the temperature of both membrane and deck on hot days.
220. Principles of design and execution of the last storey in flat roof buildings: / in Hebrew /:
MINISTRY OF WORKS, ISRAEL, HOUSING DEPARTMENT:
Tel-Aviv, the Ministry, 1963, pp. 6.
Internal instruction sheets based on research and on observations in a large number of buildings.
221. Bituminous waterproofing in building: / in Hebrew /:
MINISTRY OF WORKS, ISRAEL, PUBLIC WORKS DEPARTMENT:
Tel-Aviv, the Ministry, 1963, pp. 19-27.
A description of the present standard practice methods of execution.
222. Calculation of the moisture regime in the design of roofs:
/ in Russian /:
M.I. POVALYAEV:
Promyshlennoe Stroitel'stvo, 1963 (January), 22-26.
To prevent undue accumulation of ice and frost in roofs in cold climates the construction of a vapour barrier as close as possible to the heat insulating layer, or of cavities or ducts communicating with the external air is recommended. If this is not possible the moisture-content of the internal atmosphere must be regulated.
223. Experience with non-rolled roofing covers of cold mastic asphalt:
/ in Russian /:
O.I. YAKOVLYEV and G.K. ZAKHAR'INA:
Promyshlennoe Stroitel'stvo, 1963 (January), 32-36.
Cold mastic asphalt covering is competitive with rolled-on covering if strict attention is paid to the preparation and application of the material and to the design details of the solid support.

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