

CONTENTS

PAPERS AND DISCUSSIONS

(Alphabetical Indexes Begin on Page 1483)

No.		PAGE
2423	WATER POLLUTION CONTROL BY INTERSTATE COOPERATION: A SYMPOSIUM	1
	INTRODUCTION.....	2
	NEW ENGLAND POLLUTION CONTROL COMPACT	
	By Warren J. Scott.....	4
	CLASSIFICATION OF MASSACHUSETTS STREAMS	
	By Arthur D. Weston.....	9
	SANITATION COMMISSION FOR NEW YORK, NEW JERSEY, AND CON- NECTICUT	
	By Seth G. Hess.....	20
	RIVERS AND HARBORS IN THE DELAWARE RIVER BASIN	
	By James H. Allen.....	25
	STREAM SANITATION IN THE TENNESSEE VALLEY	
	By Robert N. Clark.....	27
2424	CORRECTION OF RESERVOIR LEAKAGE AT GREAT FALLS DAM	
	By A. H. Weber.....	31
2425	INFLUENCE CHARTS FOR CONCRETE PAVEMENTS	
	By Gerald Pickett and G. K. Ray.....	49
2426	IMPROVEMENTS AT THE BACK RIVER SEWAGE WORKS, BALTIMORE, MD.	
	By C. E. Keefer.....	74
2427	MATHEMATICAL ANALYSIS OF AN AERIAL SURVEY	
	By Lo-Ho.....	101
2428	SLOPE DEFLECTION EQUATIONS FOR CURVED MEMBERS	
	By Keith T. Fowler.....	125
2429	COMPUTATION OF EQUITABLE CHARGES FOR TREATMENT OF MUNICIPAL SEWAGE	
	By Ellis E. Bankson.....	145
2430	ANALYTICAL METHOD OF DETERMINING THE LENGTH OF TRANSITION SPIRAL	
	By Michael V. Smirnof.....	155
	Discussion:	
	By T. F. HICKERSON.....	159
	THOMAS R. KLINGEL.....	160
	CARL F. MEYER.....	162
	JOSEPH BARNETT.....	165
	J. J. LEMING.....	166
	ALLEN G. TYSON.....	166
	DONALD THOMPSON.....	168
	RALPH A. MOYER.....	171
	MICHAEL V. SMIRNOFF.....	179

IV

No.		PAGE
2431	DIVERSION TUNNEL AND POWER CONDUIT OF NANTAHALA HYDROELECTRIC DEVELOPMENT	
	By D. J. Bleifuss.....	186
	Discussion:	
	By JOSEPH R. BOWMAN.....	217
	D. J. BLEIFUSS.....	221
2432	A STUDY OF END CONNECTIONS FOR STRUTS	
	By Marshall Holt and J. W. Clark.....	223
	Discussion:	
	By JACK R. BENJAMIN.....	246
	JAMES W. HARLAND.....	246
	F. P. SHEARWOOD.....	246
	S. K. GHASWALA.....	248
	MARSHALL HOLT AND J. W. CLARK.....	250
2433	POLLUTION ABATEMENT POLICY	
	By Thomas R. Camp.....	252
	Discussion:	
	By J. E. MCKEE.....	261
	ELWOOD L. BEAN.....	262
	THOMAS R. CAMP.....	263
2434	HIGH-VELOCITY FLOW IN OPEN CHANNELS: A SYMPOSIUM.....	265
	FOREWORD.....	266
	MECHANICS OF SUPERCRITICAL FLOW	
	By Arthur T. Ippen.....	268
	DESIGN OF CHANNEL CURVES FOR SUPERCRITICAL FLOW	
	By Robert T. Knapp.....	296
	DESIGN OF CHANNEL CONTRACTIONS	
	By Arthur T. Ippen and John H. Dawson.....	326
	DESIGN OF CHANNEL EXPANSIONS	
	By Hunter Rouse, B. V. Bhoota, and En-Yun Hsu.....	347
	Discussion:	
	By PAUL BAUMANN.....	364
	N. N. BHANDARI.....	370
	T. BLENCH.....	371
	CLARENCE A. HART.....	373
	FRED W. BLAISDELL.....	380
	J. H. DOUMA.....	388
	ARTHUR T. IPPEN.....	393
	ROBERT T. KNAPP.....	396
	HUNTER ROUSE, B. V. BHootA, AND EN-YUN HSU.....	398
2435	CAPILLARY PHENOMENA IN COHESIONLESS SOILS	
	By T. William Lambe.....	401
	Discussion:	
	By M. R. LEWIS.....	424
	PENG SWE-TZE.....	424
	D. P. KRYNINE.....	427
	T. WILLIAM LAMBE.....	432

No.		Page
2436	MOVEMENTS IN THE DESICCATED ALKALINE SOILS OF BURMA	
	By F. L. D. Wooltorton.....	433
	Discussions:	
	By HANS F. WINTERKORN.....	470
	J. E. JENNINGS.....	473
	F. L. D. WOOLTORTON.....	475
2437	ELASTIC RESTRAINT EQUATIONS FOR SEMI-RIGID CONNECTIONS	
	By J. E. Lothers.....	480
	Discussion:	
	By LLOYD T. CHENEY.....	495
	THOMAS C. KAVANAGH.....	496
	DEAN F. PETERSON, JR., AND JACK E. CERMAK.....	497
	J. E. LOTHERS.....	500
2438	ATCHAFALAYA DIVERSION AND ITS EFFECT ON THE MISSISSIPPI RIVER	
	By Leo M. Odom.....	503
	Discussion:	
	By E. F. SALISBURY.....	527
	JAMES F. HALSEY.....	531
	JERE W. HIGGS, JR.....	537
	LEO M. ODOM.....	543
2430	TREATMENT OF FOUNDATIONS FOR LARGE DAMS BY GROUTING METHODS	
	By A. W. Simonds, Fred H. Lippold, and R. E. Keim.....	548
	Discussion:	
	By A. MAYER.....	568
	V. L. MINEAR.....	569
	BYRAM W. STEELE.....	570
	JAMES B. HAYS.....	572
	A. W. SIMONDS, FRED H. LIPPOLD, AND R. E. KEIM.....	573
2440	PUBLIC UTILITY CONDEMNATION CASES IN THE STATE OF WASHINGTON	
	By Henry L. Gray.....	575
	Discussion:	
	By H. D. SOUTHERLAND, JR.....	588
	HENRY L. GRAY.....	589
2441	NUMERICAL COMPUTATION OF BUCKLING LOADS BY FINITE DIFFERENCES	
	By Mario G. Salvadori.....	590
	Discussion:	
	By I. K. SILVERMAN.....	625
	BRUNO A. BOLEY.....	627
	G. S. RAMASWAMY.....	628
	CHI-TEH WANG.....	629
	GEORGE HERRMANN.....	631
	MARIO G. SALVADORI.....	633
2442	THE GEOCHEMISTRY OF EARTHWORK	
	By Hyde Forbes.....	637
	Discussion:	
	By WARREN D. SMITH.....	656
	D. P. KRYNINE.....	657
	S. S. GORMAN.....	659
	CHARLES H. LEE.....	660
	GEORGE S. HARMAN.....	663
	HYDE FORBES.....	666

VI

No.		PAGE
2443	FLOOD-CONTROL OPERATION OF TENNESSEE VALLEY AUTHORITY RESERVOIRS	
	By Edward J. Rutter.....	671
	Discussion:	
	By RAY K. LINSLEY, JR.....	704
	EDWARD J. RUTTER.....	705
2444	FLOATING TUNNEL FOR LONG WATER CROSSINGS	
	By Charles E. Andrew.....	708
	Discussion:	
	By ROBERT S. MAYO.....	721
	HOMER M. HADLEY.....	722
	CHARLES E. ANDREW.....	727
2445	INFLUENCE OF HEAVY LOADS ON PAVEMENT DESIGN TRENDS	
	By K. B. Woods.....	729
	Discussion:	
	By WILLIAM S. POLLARD, JR.....	747
	K. B. WOODS.....	748
2446	PAVEMENT BEARING CAPACITY COMPUTED BY THEORY OF LAYERED SYSTEMS	
	By Guthlac Wilson and G. M. J. Williams.....	750
	Discussion:	
	By ROBERT RUCKLI.....	767
	HUGH Q. GOLDER.....	767
	GUTHLAC WILSON AND G. M. J. WILLIAMS.....	768
2447	LONG-TERM STORAGE CAPACITY OF RESERVOIRS	
	By H. E. Hurst.....	770
	Discussion:	
	By VEN TE CHOW.....	800
	HENRI MILLERET.....	802
	LOUIS M. LAUSHEY.....	803
	H. E. HURST.....	804
2448	THREE-DIMENSIONAL DISPLACEMENT DIAGRAMS FOR SPACE FRAME STRUCTURES	
	By Walter Worthington Ewell.....	809
	Discussion:	
	By W. WATERS PAGON.....	828
2449	DESIGN CHARACTERISTICS OF LOCK SYSTEMS IN THE UNITED STATES: A SYMPOSIUM.....	829
	FOREWORD.....	830
	INFLUENCE OF MODEL TESTING ON LOCK DESIGN	
	By A. Frederick Griffin.....	831
	STRUCTURAL ELEMENTS FOR EMERGENCY CLOSURES AND UNWATERING OPERATIONS	
	By C. E. Blee.....	853
	LOCK SIZES FOR INLAND WATERWAYS	
	By Ralph L. Bloor.....	864
	Discussion:	
	By BASIL STANDING.....	880
	A. FREDERICK GRIFFIN.....	880

VII

No.		Page
2450	MEASUREMENT AND ANALYSIS OF SUSPENDED SEDIMENT LOADS IN STREAMS By Martin E. Nelson and Paul C. Benedict.....	891
2451	INDUSTRIAL STREAM POLLUTION ABATEMENT By L. L. Hedgepeth.....	919
	Discussion: By S. LEARY JONES.....	928
2452	MAXIMUM LOAD CAPACITY OF BAILEY BRIDGES By Robert B. Stegmaier, Jr.....	930
	Discussion: By D. ALLAN FIRMAGE..... ROBERT B. STEGMAIER, JR.....	940 941
2453	RETROGRESSION ON THE LOWER COLORADO RIVER AFTER 1935 By J. W. Stanley.....	943
	Discussion: By T. BLENCH..... EMORY W. LANE..... J. W. STANLEY.....	955 956 957
2454	BUCKLING OF RIGID-JOINTED PLANE TRUSSES By N. J. Hoff, Bruno A. Boley, S. V. Nardo, and Sara Kaufman.....	958
	Discussion: By JACOB KAROL..... ALFRED S. NILES..... THOMAS C. KAVANAGH..... GEORGE WINTER AND OLIVER G. JULIAN..... N. J. NOFF, BRUNO A. BOLEY, S. V. NARDO, AND SARA KAUFMAN.....	987 989 990 993 995
2455	REINFORCED CONCRETE SKEWED RIGID-FRAME AND ARCH BRIDGES By Maurice Barron.....	999
	Discussion: By D. A. NETTLETON..... ERNEST H. HARDER..... EGIDIO O. DI GENOVA..... KUANG-HAN CHU..... HAROLD E. LEVENSON..... WALTER L. SCHWARTZ..... LEO SOS..... LEIF ARUP..... MAURICE BARRON.....	1030 1032 1035 1039 1040 1041 1042 1043 1048
2456	PLASTICITY OF METALS—MATHEMATICAL THEORY AND STRUCTURAL APPLICATIONS By D. C. Drucker.....	1059
	Discussion: By R. W. STEED..... JACOB KAROL..... S. K. GHASWALA..... D. C. DRUCKER.....	1073 1075 1078 1080

VIII

No.		PAGE
2457	SUCCESSIVE APPROXIMATIONS FOR BEAMS ON AN ELASTIC FOUNDATION	
	By E. P. Popov.....	1083
	Discussion:	
	By RALPH E. FADUM.....	1096
	J. V. DU PLESSIS.....	1098
	W. E. HANSON.....	1099
	JACOB KAROL.....	1101
	E. E. DE BEER AND D. KRSMANOVITCH.....	1103
	E. P. POPOV.....	1107
2458	ECONOMIC EFFECTS OF RESERVOIR SEDIMENTATION	
	By William E. Corfitzen.....	1109
	Discussion:	
	By T. BLENCH.....	1115
	MARTIN MAEVERS.....	1116
	WILLIAM E. CORFITZEN.....	1118
2459	DESIGN CURVES FOR FOOTINGS ON SOIL	
	By Winfield A. McCracken.....	1120
	Discussion:	
	By C. Y. TENG.....	1127
	PHIL M. FERGUSON.....	1128
	WINFIELD A. MCCRACKEN.....	1128
2460	SHIP RESPONSE TO RANGE ACTION IN HARBOR BASINS	
	By Basil Wrigley Wilson.....	1129
2461	CONSTRUCTION TECHNIQUE OF PASSING FLOODS OVER EARTH DAMS	
	By Andrew Weiss.....	1158
	Discussion:	
	By CLEVES H. HOWELL.....	1174
	GERARD H. MATTHES.....	1175
	ANDREW WEISS.....	1177
2462	LATERAL BUCKLING OF ECCENTRICALLY LOADED I-SECTION COLUMNS	
	By H. N. Hill and J. W. Clark.....	1179
	Discussion:	
	By JACK R. BENJAMIN.....	1192
	JACOB KAROL.....	1192
	H. N. HILL AND J. W. CLARK.....	1195
2463	HYDROLOGY OF MEXICO	
	By Andrés García Quintero.....	1197
	Discussion:	
	By ANDREW WEISS.....	1214
	MILTON O. SCHMIDT.....	1215
	GERARD H. MATTHES.....	1216
2404	UPLIFT PRESSURES IN CONCRETE DAMS	
	By Kenneth B. Keener.....	1218
	Discussion:	
	By ROSS M. RIEGEL.....	1238
	WILLIAM P. CREAGER.....	1242
	A. WARREN SIMONDS.....	1243
	FAIRFAX D. KIRN.....	1245
	SERGE LELIAVSKY BEY.....	1247
	A. H. DAVISON.....	1248
	DUFF A. ABRAMS.....	1251
	KENNETH B. KEENER.....	1260

IX

No.		Page
2465	EFFECT OF SKEW ANGLE ON RIGID-FRAME REACTIONS	
	By Walter C. Boyer.....	1265
	Discussion:	
	By D. A. NETTLETON.....	1277
	MAURICE BARRON.....	1278
	WALTER C. BOYER.....	1281
2466	SEDIMENTATION STUDIES AT CONCHAS RESERVOIR IN NEW MEXICO	
	By D. C. Bondurant.....	1283
	Discussion:	
	By T. BLENCH.....	1293
	D. C. BONDURANT.....	1293
2467	ORIGIN AND SIGNIFICANCE OF OPENWORK GRAVEL	
	By Allen S. Cary.....	1296
	Discussion:	
	By JACOB FELD.....	1309
	A. CASAGRANDE.....	1310
	A. MAYER.....	1312
	H. CAMBEFORT.....	1313
	HYDE FORBES.....	1315
	L. F. HARZA.....	1317
	ALLEN S. CARY.....	1318
2468	STRENGTH OF I-BEAMS IN COMBINED BENDING AND TORSION	
	By Basil Sourochnikoff.....	1319
	Discussion:	
	By JACOB KAROL.....	1337
	MELVIN W. JACKSON.....	1340
	BASIL SOUROCHNIKOFF.....	1342
2469	SETTLEMENT CORRECTION AT LA GUARDIA FIELD	
	By John M. Kyle.....	1343
	Discussion:	
	By D. P. KRYNINE.....	1349
	JOHN M. KYLE.....	1350
2470	IMPOSSIBILITY OF PERFORMANCE IN CONTRACTS FOR ENGINEERING AND CONSTRUCTION	
	By Robert F. Borg.....	1352
	Discussion:	
	By SAMUEL I. SACKS.....	1372
	MELVIN W. JACKSON.....	1372
	ABRAHAM M. ALOFF.....	1374
	ROBERT F. BORG.....	1375
2471	WIND-LOAD STANDARDS IN EUROPE	
	By John W. T. Van Erp.....	1378
	Discussion:	
	By PAUL ROGERS.....	1386
	CARL H. WALTHER.....	1389
	FRANCIS L. CASTLEMAN, JR., AND ARON L. MIRSKY.....	1391
	S. K. GHASWALA.....	1392
	HERBERT S. SAFFIR.....	1394
	THEODORE B. RIGHTS.....	1394
	JOHN W. T. VAN ERP.....	1395

No.		Page
2472	THE PROBLEM OF WAVE ACTION ON EARTH SLOPES	
	By Martin A. Mason.....	1398
	Discussion:	
	By ROBERT Y. HUDSON.....	1404
	FRED C. WALKER.....	1405
	HENRY H. JEWELL.....	1408
	C. L. BRETSCHNEIDER AND R. R. PUTZ.....	1409
	MARTIN A. MASON.....	1414
2473	COMPREHENSIVE PLAN FOR THE COLUMBIA BASIN	
	By William Whipple, Jr.....	1416
	Discussion:	
	By L. E. RYDELL.....	1439
2474	PRACTICAL DESIGN OF SOLID-BARREL, REINFORCED-CONCRETE SKEW STRUCTURES	
	By Bernard L. Weiner.....	1441
	Discussion:	
	By MAURICE BARRON.....	1463
	ARTHUR G. HAYDEN.....	1469
	BERNARD L. WEINER.....	1469
2475	INFLUENCE OF MEMBERSHIP TRENDS ON SOCIETY RESPONSIBILITIES: ADDRESS AT THE SUMMER CONVENTION, LOUISVILLE, KENTUCKY, JUNE 13, 1951	
	By Gail A. Hathaway, President.....	1475