

WEST PAKISTAN  
ENGINEERING CONGRESS

PROCEEDINGS  
1968

Vol. 50



LAHORE

*The West Pakistan Engineering Congress as a body does not hold itself responsible for the opinions expressed in the volume.*

*Compiled and Published*

*by*

*Syed Fayyaz Ali Shah, P.S.E.I, Hony. Secy.  
on behalf of West Pakistan Engineering Congress, Lahore*

*Printed by Mirza Muhammad Sadiq at the  
Ripon Printing Press Ltd., Bull Road, Lahore*

## Office Bearers and Council Members for 1967—68

### PRESIDENT

Mr. M. A. Waheed, P.S.E.I.

### VICE PRESIDENTS

Sh. Ahmad Hassan, P.S.E.I.

Sardar Allah Bakhsh Khan, P.S.E.I.

Mian Alim-ud-Din, S.Q.A., S.K., P.S.E.I.

Mr. C. A. Vali, P.R.S.

Dr. Mubashir Hasan.

### OFFICE BEARERS

Syed Fayyaz Ali Shah, P.S.E.I.	.. Honorary Secretary.
Mr. Iqbal Ahmad Shahab, P.S.E.	.. Honorary Joint Secretary.
Mian Mazhar-ul-Haque	.. Honorary Auditor.
Mirza Abdul Latif, P.S.E.I.	.. Honorary Treasurer.
Syed Nazir Ahmad Shah	.. Honorary Business Manager.
Dr. Nazir Ahmad	.. Honorary Editor.
Ch. Mazhar Ali, P.S.E.I.	.. Honorary Publicity Secretary.

### MEMBERS OF THE COUNCIL

Mr. A. M. Akhoond, S.K., P.R.S.	Sh. Mukhtar Ahmad, P.S.E.I.
Mr. Ashfaq Ahmad Qureshi.	Ch. Muhammad Hussain.
Rana Allah Dad Khan.	Mr. Muhammad Afzal Cheema.
Mian Anwar H. Rehman, P.S.E.I.	Mr. Muhammad Khalil, P.S.E.I.
(w.e.f. 11-11-67).	Mian Muhammad Saeed,
Mr. A. R. Zubair, P.S.E.I.	(w.e.f. 21-10-67).
Syed Faiz Omar.	Mr. Muhammad Tayyab
Mr. Haroon Rashid Toosi	Malik Nisar Ahmad.
Mr. Iqbal Sabir (upto 21-10-67).	Mr. Nasir M. Khan.
Mr. Khushal Khan, P.S.E.I.	Mian Saeed Ahmad, T.Pk., P.S.E.I.
Mr. Khalid Mahmood, P.S.E.I.	Mr. Shafiq Ahmad Khan.
Sh. Muhammad Akram, S.K., P.S.E.I.	Mr. Sarwar Jan Khan, P.S.E.I.
(Retired).	Mr. Sarfraz Khan Malik, P.S.E.I.
Mr. M. H. Tirmazi, P.S.E.I.	
(upto 11-11-67)	



M. A. WAHEED, P.S.E. I, B.Sc. (London), A.C.G.I., M.I.E. (Pak),  
Director-General Buildings, West Pakistan,  
President, West Pakistan Engineering Congress 1966-68.

## NAMES OF PAST PRESIDENTS

---

- 1912-13. The Hon'ble Sir H. P. Burt, K.C.I.E.  
1913-14. The Hon'ble Sir H. P. Burt, K.C.I.E.  
1914-15. The Hon'ble Col. R. S. Maclagan, C.B., C.I.E.  
1915-16. The Hon'ble Col. R. S. Maclagan, C.B., C.S.I.  
1916-17. Col. S. L. Craster, C.I.E.  
1917-18. The Hon'ble Mr. D. W. Aikman, C.I.E.
- 1918-19. Mr. F. W. Woods.  
1919-20. Mr. A. S. Montgomery.  
1920-21. Mr. H. M. Ives.  
1921-22. Mr. F. A. Bates.  
1922-23. Mr. F. A. Hadow.
- 1923-24. Sir Ganga Ram, C.I.E., M.V.O.  
1924-25. Mr. E. R. Foy.  
1925-26. Lt.-Col. H. E. C. Cowie, R.E.  
1926-27. Mr. A. R. Astbury.  
1927-28. Mr. R. P. Hadow.
- 1928-29. Colonel C. Walton, D.S.O., R.E.  
1929-30. Mr. W. S. Dorman.  
1930-31. Mr. F. C. Pavry.  
1931-32. Mr. J. B. G. Smith, C.I.E.  
1932-33. R. B. W. C. Chopra.
- 1933-34. Lt.-Col. W. Macrae, R.E.  
1934-35. R. B. M. S. Dhody.  
1935-36. Mr. D. Macfarlane.  
1936-37. Mr. J. D. H. Bedford.  
1937-38. R. B. B. N. Singh.
- 1938-39. Mr. D. A. Howell.  
1939-40. R. B. B. P. Varma.  
1940-41. Mr. R. Trevor Jones, M.C.  
1941-42. Mr. A. St. G. Lyster.  
1942-43. Sir William Roberts, C.I.E.

- 1943-44. Sir Arthur Griffin, Kt., O.B.E.  
1944-45. Mr. F. F. Haigh, C.I.E.  
1945-46. Mr. A. M. R. Montagu, C.I.E.  
1946-47. R. B. D. K. Khanna.  
1949-51. K. B. M. A. Hamid.
- 1951-52. Khan Mohammad Azam.  
1952-54. K. B. K. A. Ghafoor.  
1954-55. Qazi Zahur Hussain.  
1955-56. Mr. A. D. Ashraf.  
1956-57. Khan Mohammad Inamullah Khan.
- 1957-58. Mr. M. M. Zubair.  
1958-59. Mr. Mir-Bashar Khan.  
1959-60. Mr. S. I. Mahbub.  
1960-61. Mr. Ghulam Sadiq Khan.  
1961-62. Mian Abdul Aziz.
- 1962-63. A. Rashid Kazi, S.Q.A.  
1963-65. Ch. A. Hamid.  
1965-66. A. M. Akhoond, S.K., P.R.S.

## CONTENTS

	Pages
PAPER No. 381	
Wapda Northern Grid System Need for Peaking Generating Capability 1970-1975	
—A. Rahimtoola ..	1—28
PAPER No. 382	
A Steel Industry for Pakistan: An Appreciation	
—S. Shafqat Ali ..	29—50
PAPER No. 383	
Experimental Use of Hydrated Lime in Road Construction	
—Tajamal Hussain Qureshi, P.S.E.I and Hashmat Ali ..	51—95
PAPER No. 384	
Scientific Land and Water Use for Increased Production in West Pakistan—Ch. Muhammad Hussain ..	97—129
PAPER No. 385	
Design and Construction of Chichawatni Bridge	
—Abdus Salam, P.S.E.I and S. U. Qureshi ..	131—164
PAPER No. 386	
Road Problems in Slip Affected Areas	
—M. A. Waheed, P.S.E.I and Muzaffar Iqbal Sheikh ..	165—184
PAPER No. 387	
Immunsation of Signalling Equipment in Connection with Electrification of Lahore-Khanewal Section of Pakistan Western Railway	
—M. H. Bhaur, B.Sc. Eng., M.A., A.R., P.R.S.E. ..	185—201
PAPER No. 388	
Crushed Brick in Road Construction	
—Mazhar-ul-Haq Saeed Ahmad, P.S.E.I ..	203—222
PAPER No. 389	
Adaptation of Equiangular Spiral as an Open Channel Curve	
—Khalid Mahmood, P.S.E.I ..	223—276
PAPER No. 390	
Structural Investigations of Sukkur Barrage Arches	
—Mr. Mazhar Ali, P.S.E.I ..	277—330
LIST OF PREVIOUS PAPERS ..	331—349
LIST OF AWARDS ..	350—353