

## **CV of Ir Prof. WONG, Yuk Lung**

*DipCE, MEng, PhD, FHKIE, RPE(BUD, FRE, MAT), RI(E), FHKISC, FHKCI, FHKICA*

### **Academic Qualifications**

Diploma in Civil Engineering from Hong Kong Baptist College in 1977,  
MEng in Structural Engineering from Asian Institute of Technology, Thailand in 1979,  
PhD in Civil Engineering from University of Canterbury, New Zealand in 1990.

### **Professional Qualifications**

FHKIE (BUD, FRE, MAT),  
Registered Professional Engineer (BUD, FRE, MAT),  
RI (E),  
HOKLAS Technical Assessor (2009-2018) in areas of concrete and fire  
HKCAS Technical Expert (2010-2018) in areas of concrete and fire

### **Committee Member of Government Bodies and HKIE**

Member of Accreditation Board Working Party on Construction Materials Testing (2010-2013),  
Member of Task Force on Accreditation of Construction Products Certification Bodies under  
Accreditation Advisory Board Working Party on Accreditation of Certification Bodies (2010-  
2013),  
Member of Technical Committee for Code of Practice for Structural Use of Concrete of Buildings  
Department of Hong Kong SAR (2008-2014),  
Member of Inspectors Registration Committee Panel and Inspectors Registration Committee  
Section 3(5) of the Buildings Ordinance Cap 123 (2012-2013),  
Member of Technical Committee on the Code of Practice for the Mandatory Building Inspection  
Scheme and the Mandatory Window Inspection Scheme of Buildings Department (2014-2016),  
Member of South District Fire Safety Committee of South District Council (2011-2014),  
Member of Appeal Board Panel (Amusement Rides Safety) of Home Affairs Bureau (2011-2014),  
Committee Member of HKIE Building Division (2010-2016), and HKIE Materials Division  
(2010-2013),  
Member of HKIE Training Committee (2011-2017),  
Editor of HKIE Transactions Committee (2013-2016),

### **Member of other Professional Learning Societies**

Fellow and Vice President of Hong Kong Concrete Institute,  
Fellow of the Hong Kong Institute of Steel Construction,  
Fellow and Executive Board Member of Fire Protection Association,

Fellow, Certified Laboratory Manager and Registered Auditor of Hong Kong Institution of Certified Auditors

Hon. Technical Advisor of Passive Fire Protection Research Centre

### **Member of Academic Institutions**

Professor of Chu Hai College of Higher Education (2014-present),

Adjunct Professor of Technological and Higher Education Institute of Hong Kong (Thei) (2013-2015),

Academic Assessor of HKUSPACE Higher Diploma in Engineering Programme (2012-2016)

### **Professional and Teaching/Research Experience**

From 1979 to 1985, Dr Wong served in Scott Wilson Kirkpatrick & Partners H.K. as an Assistant Engineer and then an Acting Resident Engineer. He engaged in various design works of reinforced concrete structures, such as industrial buildings, Tuen Mun hospital, a sewage screening plant, and carpark buildings. He gained his site experience from the supervision of the construction works in the Tsuen Wan –Tsing Yi Development, and the Taikoo Shing Project. Dr Wong also worked in Maunsell Consultant Asia, H.K. as an Engineer for six months in 1991, participating in the design of the 65 storey Gilman Plaza building.

From September 1991 to May 2014, Dr Wong was an academic staff of the Department of Civil and Structural Engineering of The Hong Kong Polytechnic University, and held a title of an Associate Professor. He taught BSc and MSc courses in temporary works, concrete mix design, reinforced concrete design, and concrete under fire. Dr Wong was the academic-in-charge of the Heavy Structures Laboratory and Concrete Laboratory, and was appointed as the course leader of the Part-time Degree of BEng (Hons) in Civil Engineering.

Since September 2014, Dr Wong is appointed as a Professor of Chu Hai College of Higher Education to teach structural engineering subjects.

Dr Wong has been the investigator of over 23 research projects in the areas of concrete technology (high performance concrete and concrete under high temperatures), and structural/earthquake engineering. Eight PhD students and two MPhil students were graduated under his supervision. He has published 41 technical papers in concrete technology and 88 technical papers in structural/earthquake engineering, and two monographs.

Beside teaching and research work, Dr Wong is very active in serving a number of positions in the local professional institutions and offering consultancy services to local construction industry.

## **Selected Professional Service**

### **(i) In Academic Areas**

- From 1996 to present, Dr Wong was invited to be an external examiner of PhD and MPhil students for Hong Kong University, Hong Kong University of Science and Technology, and City University of Hong Kong.

### **(ii) In Engineering Practice Areas**

- In 1996, Dr Wong engaged in the consultancy work on review and assessment of construction related standards for Architectural Services Department.
- In 2005, Dr Wong was responsible for the consultancy work of testing waterproofing membrane and system applied to concrete bridge deck for Highways Department.
- In 2006, Dr Wong was one of the reviewers of Particular Specifications for Highways Department in the consultancy work.

### **(iii) In Concrete Technology and Structural Appraisal Areas**

- In 2000, Dr Wong was the lead investigator of the consultancy work on the investigation of damp patches in buildings of Tin Shui Wai Area 31 Phase I for Yiu Wing Construction Co. Ltd.
- In 2004, Dr Wong was the lead investigator of the consultancy work on the investigation of In-service Support Tubes of Overhead Line Suspension System for MTR.
- In 2005, Dr Wong was the lead investigator of the technical investigation of CHW-HFC Crossover OHL Cantilever Top Tube Collapse on 29 July 2005 for MTR.
- In 2005, Dr Wong was the lead investigator of the Expert Report on Alternative Shear Link Details in Beams for International Exhibition Centre at Hong Kong International Centre for Dragages Hong Kong Limited.
- In 2007, Dr Wong was the lead investigator of Concrete Placement Temperature for Transfer Plate of Mixed Use Development at Macau for Hip Hing Engineering (Macau) Co. Ltd.
- In 2009, Dr Wong was the lead investigator of Investigation of Falling Villa Board at Balcony Ceiling of One Beacon Hill for Ove Arup & Partners Hong Kong Limited.
- In 2009, Dr Wong was the lead investigator of Strength, Durability, and Quality of Trial Wall and Trial Column of TKO Carcass Contract for Chun Wo Building Construction Ltd.
- In 2009, Dr Wong was the lead investigator to conduct Non-destructive Tests on Podium Deck of Macau Cotai Area-CS998 for Galaxy Project Management co. Ltd.
- In 2010, Dr Wong was one of the investigators to study the Expected Useful Life of Housing Authority Buildings Completed after 1987 for Housing Department.
- In 2011, Dr Wong was the investigator to study the use of rapid hardening concrete and SBR mortar in preservation of concrete carriageway for Highways Department.
- In 2013, Dr Wong was the lead investigator of determining the Pattern and Capacities of Hanging Loads applied to the Steel Roof Truss System of Stadium in Macau for LECM.
- In 2013, Dr Wong was the investigator to study the Performance of Reconstituted Stone Tiles used for Exterior Wall Finishing for City-Sky Development Ltd.

- In 2014, Dr Wong was the investigator to study the Performance of Synlime in render/plaster for Viva Packaging Holdings Limited.
- In 2014, Dr Wong was the lead investigator to review the specifications of tile adhesive and workmanship for laying external wall tiles in Hong Kong for Hong Kong Housing Society.
- In 2014, Dr Wong was the investigator to review documents of renovation work of residential buildings at Sha Tin 33, 16 Sui Wo Road, Fatan.
- In 2015, Dr Wong was the investigator to study the causes of tile detachment from the external walls of a residential building for Hip Hing Construction Ltd.
- In 2015, Dr Wong was the investigator to study different admixtures to enhance water tightness of concrete for Elixir Waterproofing Works Co. Ltd.
- In 2015, Dr Wong was the investigator to study the causes of tile detachment from the external walls of a hotel building for Chanco Investment Group.
- In 2015, Dr Wong was the investigator to assess/propose concrete temperature controls of large concrete pour for West Rail Tsuen Wan West Station Property Development for Hip Hing Construction Ltd.
- In 2015, Dr Wong was the investigator to assess/propose remedial work caused by grouting leaking of construction of Public Rental Housing Development at Tuen Mun for Gammon Construction Ltd.
- In 2016, Dr Wong was the investigator to study the causes of water seepage of podium slab of a hotel building for Chanco Investment Group.

**(iv) In Fire-damaged Concrete Appraisal Areas**

- In 2007, Dr Wong was the lead investigator of Durability Assessment and Long Term Remedial Measures for The Fire Damaged Area at Hau Tak Market for Ho Tin & Associates Consulting Engineers Limited.
- In 2008, Dr Wong conducted training seminars on Fire Engineering in Building, and Concrete Technology for staff of Hong Kong Housing Authority.
- In 2011, Dr Wong was the investigator to study the use of monofilament fibre on fire resistance of Cat A concrete for Hong Kong Concrete Producers Association.
- In 2012, Dr Wong was an adviser to Meinhardt Consultant Limited on the damage assessment of Harbour Grand Hotel Fire on 21 April 2012.
- In 2013, Dr Wong was the investigator to conduct Structural Assessment for Fire Damaged Areas at Tai Shing Street market at Wong Tai Sin for Architectural Services Department.
- In 2014, Dr Wong provided an in-house training seminar on inspection and assessment of fire damaged structures to The Hong Kong Housing Authority.

**(v) In Tempered Glass Areas**

- In 2011, Dr Wong attended technical courses offered by HKICA on Technical Knowhow of Tempered Glass, and by CASTCO on Heat Soak Process Details. Since then, he became an independent assessor to Safety, Accident, and Failure Experts Ltd to investigate the causes of glass breakage: Lift Enclosure at Jordan, Club House Façade Panel at Tseung Kwan O, Fire Rated interior Façade Glass Panels Deterioration at a shopping arcade, Lobby Glass Panel at a Hotel at Tsim Sha Tsui, Curtain Wall Glass Panel at a hotel at Tsim Sha Tsui, Glass Balustrade and Façade Panel of a hotel, and to advise the Heat Soak Process of Tempered Glass.

**(vi) In Passive Fire Protection Areas**

- Since 2012, Dr Wong was the Technical Advisor of Intumescent Systems (Greater China) to develop new products on fire resisting panel and shutter systems. An innovative patented shutter system achieving the fire resisting rating of 4 hours insulation was developed.

**(vii) Expertise in Developing Product Conformity Certification Schemes for Construction Materials**

Dr Wong was the Chairman of Technical Committees of Product Conformity Certification Schemes (2009-2012, see Websites: [www.hkisc.org](http://www.hkisc.org), <http://www.hongkongci.org/preSpeech.html>)

Passive Fire Protection Products,  
Tile Adhesives,  
Cement,  
Repair Mortar,  
Aluminum Windows,  
Steel Reinforcement Mesh.

Currently (from 2014), Dr Wong is the Chairman of the Drafting Committee of Product Conformity Certificate Schemes of Aggregates for Concrete complying with CS3.

**Public Lectures on Concrete**

From 2003 to present, Dr Wong was the invited speaker to present public lectures on concrete to Engineers in Hong Kong:

- Concrete under Fire *in Materials Science and Technology in Engineering Conference – Now, New, and Next*, organized by Materials Division of HKIE, 2003.
- Self Compacting Concrete – before and after Exposure to Elevated Temperatures *in ACI China Chapter Inaugural Symposium*, organized by ACI China Chapter, 2004.
- Spalling of Concrete under Fire *in International Seminar on Recent Development of Fire Protection in Structures*, organized by Fire Group of HKISC, 2004.
- Effects of Fire on Durability of RC Structures *in Annual Concrete Seminar of Standing Committee on Concrete Technology*, organized by Standing Committee on Concrete Technology, 2005.
- Review of Fire Resistance Design of Reinforced Concrete Buildings *in Second International Seminar on Recent Developments of Fire Protection in Structures*, organized by Fire Group of HKISC, 2006.
- Properties of Concrete and Steel under Fire *in Advances in Fire Testing and Codifications*, organized by Research Centre for Fire Engineering and Fire Group of HKISC, 2006.
- Effects of Fire on Reinforced Concrete *in Designing Buildings and Infrastructure for Wind, Fire and other Extreme Events*, organized by ASCE Hong Kong Section, 2006.

- Fire Resistance of High Strength Concrete in *ArchSD Headquarter*, 2007.
- Fire Resistance of High Strength Concrete in *Technical Seminar of HKIE Structural Division*, 2008.
- Study of So Uk Fire Test – Concrete Spalling of Reinforced Concrete Member in *Firestop Academy*, organized by Hong Kong Institution of Engineers Materials Division, 2011, and *Technical Seminar of HKIE Building Division*, 2012.
- Fire Resistance Design and Protection for Concrete, *Annual Concrete Seminar 2013*, organized by Standing Committee on Concrete Technology, 2013.
- Inspection and Assessment of Fire Damaged Structures, The Hong Kong Housing Authority, 2014.
- HKIE Technical Seminar on Controversial Issues of New Code Requirements on Fire Separation and Performance of Fire Shutters, organized by HKIE Building Division, Mar 2015.
- HKIE Technical Seminar on Practical Solutions for Repairing Reinforced Concrete Carports with Rapid Traffic Resumption, organized by HKIE Building Division, Aug. 2015.
- HKIA Technical Seminar on Review on New Code Requirements of Fire Separation by Means of Fire Shutters and Sprinklers in Hong Kong, organized by HKIA, Sep. 2015.
- HKIS Technical Seminar on Tiling Systems at External Walls of buildings: Common Causes of Failure and Methods of Repair, organized by The Hong Kong Institute of Surveyors, Dec. 2015.
- HKIE Technical Seminar on Tiling Systems at External Walls of buildings: Common Causes of Failure and Methods of Repair, organized by HKIE Building Division, Jan. 2016.
- HKIS Technical Seminar on Concrete Repair for Carports with Rapid Traffic Resumption, organized by The Hong Kong Institute of Surveyors, Mar. 2016

From 2005 to present, Dr Wong was the co-organizer and co-editor of (i) International Seminar in Recent Developments of Fire Protection in Structures 2006 and 2008, and (ii) Advances in Fire Testing and Codifications 2006.

**List Research Projects conducted by Dr Y.L. Wong in The Hong Kong Polytechnic University (from 1991 to 2012)**

**(i) *In the capacity as Principal Investigator***

- Development of Innovative Self-compacting Lightweight Precast Structural Concrete for Building Construction,
- Spalling of High Strength Concrete Columns in Existing Buildings under Standard Fires,
- Spalling of High Strength Concrete under Fire – Quantification and Prevention,
- Water Quenching Effect on Reinforced Concrete Structures under Fire
- Effects of High Temperatures on PFA Concrete,
- Thermal Stress and Associated Damage in Concrete at Elevated Temperatures.
- A Study of High Volume Fly Ash Concrete,
- The Effects of PFA on the Alkali-Silica Reaction in Concrete,
- Nonlinear Analysis of Semi-rigid Composite Connections under Lateral Cyclic Loading – Experimental and Theoretical Study,

- Design and Analysis of Prestressed Steel-concrete Composite Construction,
- Seismic Response Spectra for Hong Kong
- Estimation of Seismic Responses of Soft Sites in Hong Kong.
- Behaviour of Hybrid FRP-concrete-steel Double-skin Tubular Columns Subjected to Eccentric Compression
- Water Quenching Effect on Reinforced Concrete Structures under Fire
- Torsional Response of Asymmetric Frame Buildings with One Major Wall
- Effects of Different Particle-size Waste Glass Replacing Sand and Crushed Fine Stone in Pre-cast Concrete Block Prepared by Dry-mixed Method

(ii) *In the capacity as Co-investigator*

- Soil-pile-structure Interaction under Seismic Excitations: A Simple Analytic Approach,
- Potential Use of Metakaolin in Architectural and Marine Concrete Structures,
- Seismic Resistance of Non-ductile Transfer Plate System in High-rise Buildings in Hong Kong
- Strength and Ductility of Typical Reinforced Concrete Coupling Beams in High-rise Buildings
- High Performance Zeolite Concrete
- Analysis of Transfer Plate Behavior subjected to Moderate Earthquake
- Analysis for Soil-pile-structure Interaction of Structures on Multi-layered Nonlinear Soil under Seismic Excitation

**Selected Publications**

(i) **Papers on concrete technology and concrete under fire**

- CHEN, X.L., WONG, Y.L., and POON, C.S., "The Mechanism of PFA on Suppressing Alkali-silica Expansion in Accelerated Testing", Proceedings of Concrete 97, Concrete Institute of Australia, May 1997, pp. 409-412.
- WONG, Y.L., POON, C.S., and LAM, L., "Strength Development of Normal and High Strength PFA Concretes under Different Curing Environments", Proceedings of Concrete 97, Concrete Institute of Australia, May 1997, pp. 145-151.
- WONG, Y.L., LAM, L., POON, C.S., and ZHOU, F.P., "Properties of Fly Ash Modified Cement Mortar-Aggregate Interfaces", Cement and Concrete Research, Vol. 29(12), Dec., 1999, pp. 1905-1913.
- LAM, L., WONG, Y.L., and POON, C.S., "Degree of Hydration and Gel/Space Ratio of High-volume Fly Ash/Cement Systems", Cement and Concrete Research, 30, 2000, pp. 747-756.
- XU, Y., WONG, Y.L., POON, C.S., and ANSON, M., "Influence of PFA on Cracking of Concrete and Paste after Exposure to High Temperature", Cement and Concrete Research, Vol. 33, Issue 12, Dec. 2003, pp. 2009-2016.
- FU, Y.F., WONG, Y.L., POON, C.S., LIN, P., and TANG, C.A., "Experimental Study of Micro-macro Crack Development and Stress-strain Relations of Cement-based Composite Materials at Elevated Temperatures", Cement and Concrete Research, Vol. 34, Issue 5, May, 2004, pp. 789-797.

- WONG, Y.L., "Spalling of Concrete under Fire", International Seminar on Recent Development of Fire Protection in Structures, Hong Kong, Feb. 2004, pp. 41-51.
- FU, Y.F., WONG, Y.L., POON, C.S., and TANG, C.A., "Stress-strain Behaviour of High Strength Concrete at Elevated Temperatures", Magazine of Concrete Research, Vol.57, No. 9, Nov. 2005, pp. 535-544.
- FU, Y.F., WONG, Y.L., POON, C.S., and TANG, C.A., "Literature Review of Study on Mechanism of Explosive Spalling in Concrete at Elevated Temperatures", Journal of Building Materials, 9(3) 2006, pp. 323-329.
- WONG, Y.L., FU, Y.F., POON, C.S., and TANG, C.A., "Spalling of Concrete Cover of Fiber-reinforced Polymer Reinforced Concrete under Thermal Loads", Materials and Structures, DOI 10.1617/s11527-005-9032-5, 39, 2006, pp. 991-9999.
- WONG, Y.L., "Review of Fire Resistance Design of Reinforced Concrete Buildings", Proceeding of Second International Seminar on Recent Developments of Fire Protection in Structures", Fire Group of The Hong Kong Institute of Steel Construction, Jan. 2006, pp.28-40.
- FU, Y.F., WONG, Y.L., POON, C.S., and TANG, C.A., "Numerical Tests of Thermal Cracking Induced by Temperature Gradient in Cement-based Composites under Thermal Loads", Cement and Concrete Composites, 29, 2007, pp. 103-116.
- FU, Y.F., WONG, Y.L., POON, C.S., and TANG, C.A., "Numerical Tests of Thermal Cracking Induced by Temperature Gradient in Cement-based Composites under Thermal Loads", Cement and Concrete Composites, 29, 2007, pp. 103-116.
- WONG, Y.L., "Reinforced High Strength Concrete under the Influence of Fire", The Structural Engineer, Jun. 2007, pp. 19-22.
- WONG, Y.L., "Minimization of Spalling of Concrete Cover under Fire Exposure", Proceeding of Materials Science and Technology in Engineering Conference 2007, Hong Kong, Jun. 2007.
- YAN, X., LI, H. and WONG, Y.L., "Effect of Aggregate on High-strength Concrete in Fire", Magazine of Concrete Research, Jun. 2007, pp. 323-328.
- YAN, X, LI, H. and WONG, Y.L., "Assessment and Repair of Fire-damaged High-strength Concrete: Strength and Durability", Journal of Materials in Civil Engineering, ASCE, Jun. 2007, pp. 462-469.
- MAK, Y.W., and WONG, Y.L., "Assessment and Repair of Fire-damaged Building – A Case Study", Proceeding of Third International Seminar on Recent Developments of Fire Protection in Structures, May 2008, pp. 91-98.
- WONG, Y.L., "Study of So Uk Fire Test – Concrete Spalling of Reinforced Concrete Member", Proceeding of Fire Academy of Hong Kong Institution of Engineers Materials Division, May 2011, pp. 3-15.

**(ii) Papers on structural/Earthquake Engineering**

- WONG, Y.L., PAULAY, T., and PRIESTLEY, M.J.N., "Squat Circular Reinforced Concrete Columns under Multi-directional Seismic Attack", ACI Structural Journal, Vol. 91, No. 2, Mar. 1993, pp. 180-191.
- WONG, Y.L., CHAN, S.L., and NETHERCOT, D.A., "A Simplified Design Method for Non-sway Composite Frames with Semi-rigid Connections", The Structural Engineer, Journal of the Institution of Structural Engineers, Vol. 74, No. 2, Jan. 1996, pp. 23-28.
- WONG, Y.L., ZHAO, X., CHAU, K.T., and LEE, C.M., "Assessment of Seismicity Model for Hong Kong Region", HKIE Transactions, Vol. 5, No. 1, Apr. 1998, pp. 50-62.
- WONG, Y.L., ZHAO, X., LAM, S.S., and CHAU, K.T., "Assessing Seismic Response of



- Soft Soil Sites in Hong Kong Using Microtremor Records", HKIE Transaction, Vol. 5, No. 3, Dec. 1998, pp. 70-79.
- WONG, Y.L., and ZHENG S., "Simulated Strong Ground Motion in Southern China Based on Regional Seismographic Data and Stochastic Finite-Fault Model", presented in ANCER 2004 Annual Meeting, Honolulu, Jul. 2004.
- WONG, Y.L., and ZHENG, S., "Ground Motions in Hong Kong due to Potential M7.0 Earthquake in Fault Zone of Dangan Island", Proceedings of International Symposium on Earthquake Engineering in the Past and Future Fifty Years, Harbin, Aug. 2004.
- WONG, Y.L., DAI, J.W., ZHANG, M.Z., and GUO, X., "Seismic Behaviour of Asymmetric Structures under Shaking Table Tests", Proceedings of ANCER 2005 Annual Meeting, Jeju, Korea, Nov. 2005.
- WONG, Y.L., YU, T. and CHAN, S.L., "A Simplified Analytical Method for Unbraced Composite Frames with Semi-rigid Connections", Journal of Constructional Steel Research, 63, pp. 961-969, 2007.
- WONG, Y.L., YU, T., TENG, J.G. and DONG, S.L., "Behavior of FRP Confined Concrete in Annular Section Columns", Composites Part B: Engineering, 39, 2008, pp. 451-466.
- YU, T., TENG, J.G., WONG, Y.L. and DONG, S.L., "Finite Element Modeling of Confined Concrete – I: Drucker-Prager Type Plasticity Model" Engineering Structures, Volume 32, Issue 3, March, 2010, pp. 665-679.
- YU, T., TENG, J.G., WONG, Y.L. and DONG, S.L., "Finite Element Modeling of Confined Concrete – II: Plastic-damage Model" Engineering Structures, Volume 32, Issue 3, March, 2010, pp. 680-691.
- PENG, X.N., and WONG, Y.L., "Behaviour of Reinforced Concrete Walls subjected to Monotonic Pure Torsion – An Experimental Study", Engineering Structures, Vol. 33, Issue 9, 2011, pp. 2496-2508.
- PENG, X.N., and WONG, Y.L., "Experimental Study on Reinforced Concrete Walls under Combined Flexure, Shear and Torsion", Magazine of Concrete Research, Vol. 63(6), 2011, pp. 459-471.
- PENG, J., HO, J.C.M., PAM, H.J., WONG, Y.L., "Equivalent Stress Block for Normal-strength Concrete Incorporating Strain Gradient Effect", Magazine of Concrete Research, Vol. 64(1), 2012, 1-20.

**(iii) Monographs**

- WONG, Y.L., CHAU, K.T., LAM, S.S., and ZHAO, X., "Seismic Design for Hong Kong: A Review of Seismic Design of Soil-structure Interaction, and Assessing Seismic Response of Soft Soil Sites in Hong Kong", Construction Industry Development Studies and Research Centre (CIDARC), The Hong Kong Polytechnic University, Dec. 1998, 99p.
- WONG, Y.L., "Comparison of Composite Beam Design by Three National Standards", Construction Industry Development Studies and Research Centre (CIDARC), The Hong Kong Polytechnic University, Feb., 2000, 18p.

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