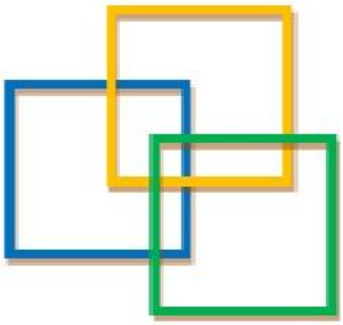
Hong Kong Institute of Utility Specialists
Non – profit Making Organization

Work Procedure
For
Manhole Internal Condition Survey (MHICS)



Publisher:

Utility Training Institute (UTI)
A trade name of UTI (International) Ltd. 管綫學院

Supporting Organization:

CCPDC社建
Community & Construction Professionals' Development Centre
社區、建造及工程專業發展中心

Foreword

Since the disastrous landslip that occurred in Kwun Lung Lau on Hong Kong Island on 23 July, 1994. Since 1995, the Government of HKSAR is investing tens of millions of dollars in contracts related to detection of leakage from buried water carrying services (BWCS) both on slopes and on the roads throughout the territory. As expected, this sequence of events generated an increasingly large pool new profession in the Hong Kong market, Utility Specialists (US). Most of the Utility Specialist working almost independently, devoid of any standardized surveying methods and quality requirements (on survey results). No formal registration system was in place for Utility Specialist in the industry as recognized operational personnel in the market before the establishment of HKIUS in 2002.

In addition to the above, HKIUS consider it is the best to have a standardized work procedure for the industry to execute survey works and report under a standardized guideline. By consolidating all various method statements, specifications, training manuals, and the contracts documents produced for the vast number of underground utility survey contracts (government and private projects) available in the market, a comprehensive and standardized work procedure is produced. The standardized work procedure baiscally addressing the following topics in general:

(1) Planning and Preparation on Utility Services Information to be investigated
(2) Requirement of Personnel and Equipment for the Investigation Works
(3) Level of Accuracies
(4) Scheduling and Reporting
(5) Requirement of Deliverables in report format.

Such work procedure provides a straight forward and easy to follow to enable anyone from Client to Contractors and all Utility Specialist to understand. From here HKIUS unify all utility specialists in the Hong Kong market and become world class professionals.

You are welcome to take reference to this Particular Specification for your contract and in case you need further information, please send an e-mail to info@hkius.org.hk or call Ir Dr. King Wong.

Mr, Zico Kai Yip KWOK
(郭啟業先生)
President, HKIUS (2010-11)
April, 2011

If any error or mistake is found in this work procedure, please kindly contact us.
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Manhole Internal Condition Survey(MHICS)

1. Work procedures of Manhole Internal Condition Survey 工作程序-沙井內部狀況評估

Note: The working procedures is mainly for ease of site operation checking, details shall refer to relevant method statement submitted separately
注意: 此工作程序主要為地盤施工的檢查帶來方便，詳情請參閱另外提交的工作說明

1. Calibration, Planning and Preparation

Steps 步驟	Part 1. Calibration, Planning and Preparation 第一部份 較準，計劃和準備工作	Completed by 檢測者
1	Reconnaissance survey 初步勘查 The full extent of assets (manholes, pipes, catchpits and other ancillaries) located within the survey extents. 搜尋檢測範圍的所有相關結構（沙井、管道、截留井及其他有關結構）。 Any other manholes and additional features not shown on the base mapping or layout plans, and/or revisions required to match existing conditions on site. 有否其他圖則遺漏了的沙井及其他結構，及有甚麼需要按現況作修改。	
2	Safety Programme and Confined Spaces 安全須知及密閉空間 Safety Plan, Risk Assessment, Permit to Work, TTA, etc. 安全計劃、風險評估、工作許可、臨時交通安排等。 Personnel – Confined Space Certificate Worker, Confined Space Permit To Work, Green Card, experience, knowledge etc. 操作員要求－密閉空間核准工人、密閉空間工作許可證、綠卡、經驗、知識等。 Potential Hazards – Confined Space, Fall, Flood, Chemical etc. 潛在危險－密閉空間、下墮、水淹、化學物等。 PPE – Steel Toe Shoes, Helmet, Harness, Safety Line, Tripod, Visual & Audio Alarm, Head Light, Protective Clothes etc. 個人保護裝置－鋼頭鞋、頭盔、安全帶、安全繩、三腳架、視覺及聽覺警報器、頭燈、安全衣等。	

2. Operation

Steps 步驟	Part 2. Operation 第二部份 操作程序	Completed by 檢測者
1	Operation shall be carried out by OMHKIUS(at least 3 years experience) or AMHKIUS (at least 2 years experience). The whole operation shall be supervised by OMHKIUS. 操作員應為管綫專業監理員(最少三年經驗)或助理管綫專業監理員(最少兩年經驗) 。 整個探測過程必須由管綫專業監理員監督。	
2	Open the manhole (refer to Fig.1). 開沙井(參考圖一)。	
3	Gas detection and other safety precautions. 氣體測試及其他安全措施。	
4	Take notes and measurements of the features of the manhole (refer to Part 2.1 and 2.2). 量度沙井及紀錄其特徵 (參考第二甲部及第二乙部)。	
5	Fill the observation and measurements in the Manhole Record Card. 將觀察及量度結果填入沙井紀錄卡。	
6	Draw Location Sketch and Plan of manhole. 繪畫沙井位置圖及平面圖。	
7	Take at least 2 photographs with manhole reference shown in the photo. 最少拍兩張照片，沙井編號必須在相片中顯示。	
8	Finish survey or survey abandoned with reason noted. 完成勘查。如放棄勘查，需注明原因。	

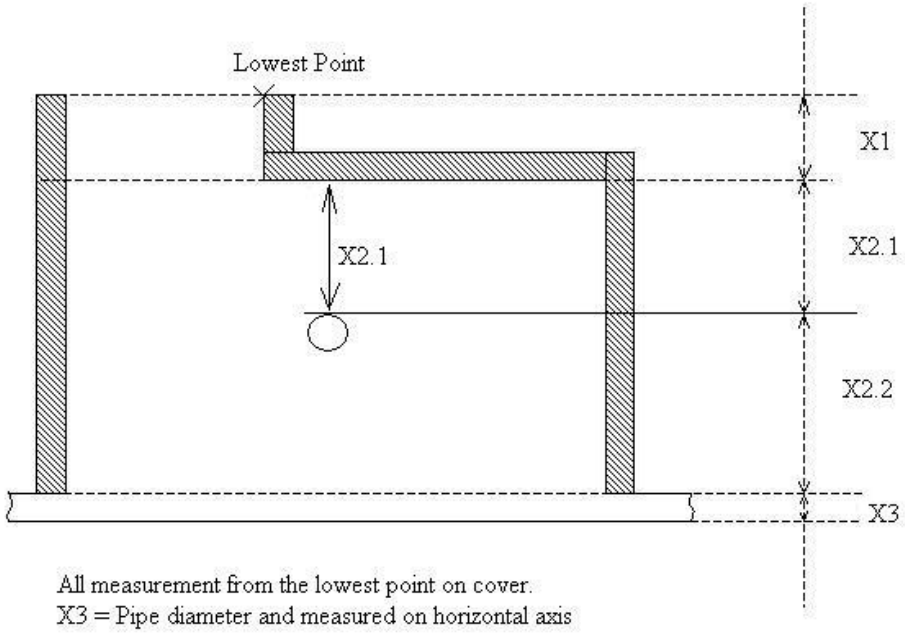
Steps 步驟	Part 2. Operation 第二部份 操作程序	Completed by 檢測者
9	QA/QC check on site by verifying some of the located alignment and check with existing records again. Determine which information is correct on site if there are difference with the records. 即場作品質監控，驗證一些已標記的路由並與現時的紀錄作對比，如與圖則有差異，需即場決定哪個是正確的資料。	
10	Replace the manhole cover. 放回沙井蓋。	
11	Hand in raw data materials to report team. 將現場搜集的資料交給報告組。	

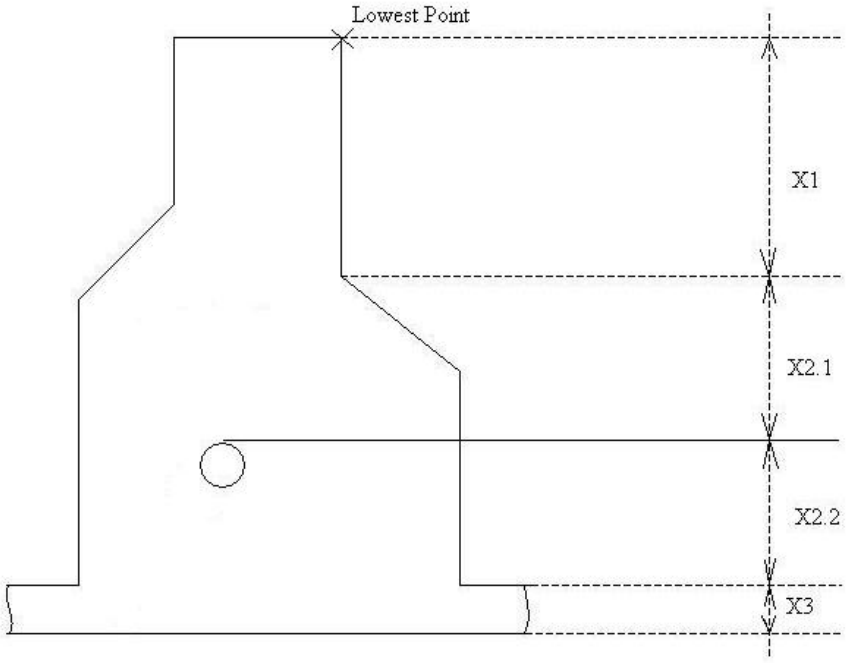
2.1 Accuracy Requirements

Accuracy Requirements 準確性要求	Standard /Tolerance 標準／公差
Grid References 座標	+ 1m/米
Location Measurement 位置測量	+300mm/毫米
Levels 平水	+ 25 mm/毫米
Relative levels of pipe inverts within the chamber 管道內底的相對標高	+ 20 mm/毫米
Pipe sizes 管道尺碼	+ 20 mm/毫米
Box-culverts 箱形暗渠	+ 20 mm/毫米
All other dimensions 其他尺寸	+ 50 mm/毫米

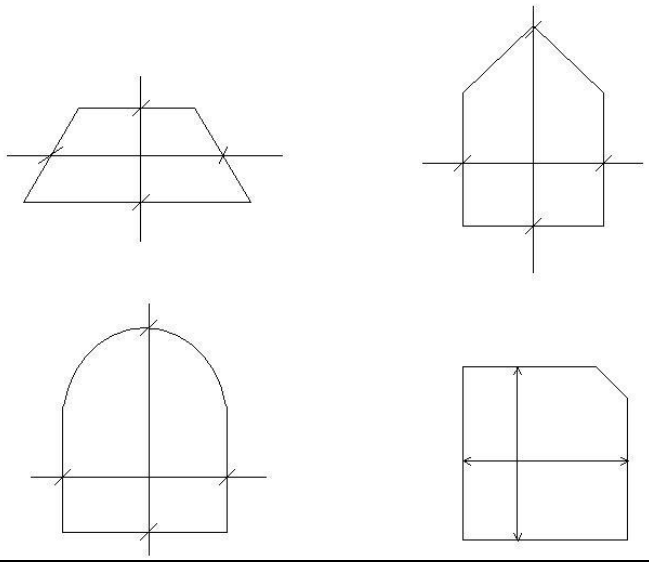
2.2 Part 2.2 Manhole Measurements

Measure internal diameter: measure horizontal instead of top/bottom 量度內直徑: 橫向量度而非量度頂/底部。
Mark X at the lowest corner. 在井蓋的最低點標記 X。





Manhole depth: All measurement from the lowest point on cover.
X3= pipe diameter and measured on horizontal axis.
井深: 從井蓋的最低點開始量度。
X3 = 橫向量度的管的直徑。



Non-regular pipe shape, measure major size of the pipe.
Width x Height in mm.
若管道是不規則形狀，量度管道的主要尺碼。
寬 x 高 (以毫米顯示) 。

3. Report

Steps 步驟	Part 3. Report 第三部份 報告	
1	Process raw data from site team. 整理現場搜集的資料。	
2	QA/QC before reporting by MHKIUS (at least 5 years experience). 報告前由管綫專業監理師(最少五年經驗)進行品質監控程序。	

Steps 步驟	Part 3. Report 第三部份 報告	
3	The report shall consists of the followings 報告需包含以下項目 (1) Location plan with all the manholes plotted within the survey extent. 已標記檢測範圍內所有沙井的位置圖。 (2) Manhole record card. 沙井紀錄卡 (3) At least 2 photographs (location photo (refer to Fig.2) 最少兩張相片（位置相片(參考圖二)及內部相片(參考圖三)） (4) Condition photos for any other circumstances (refer to Fig.4). 如有其他狀況，亦須拍照紀錄 (參考圖四)。 (5) Corresponding electronic data by computer programme validated by RPUS. 相應的電子資料由管綫專業監察師(至少八年經驗)	

4. Final Verification

Steps 步驟	Part 4. Final Verification (if requested by the client) 第四部份. 最後驗證 (如客戶要求)	Completed by 檢測者
1	If clients request, 5% smaples of the whole project and 1% samples taken on site will be picked up randomly for audit. 如客戶要求，工程報告中的 5%樣本及工地中的 1%樣本會被抽出作抽樣檢查。	
2	Samples will be checked by the competent person from another group from the same company or competent person from third party as client request. 樣本將會由同一公司中另一組合資格人仕或獨立組織中的合資格人仕作出檢查核對。	
3	The utility survey drawing for final report will then be reviewed and updated after audit. 在抽樣檢查完成後，管線成果圖會作出更新並加入最後報告中。	

Fig. 1 Open a manhole
圖一. 開沙井

Fig. 2 Manhole location photo
圖二. 沙井位置相片

Fig.3 Manhole internal photo
圖三. 沙井內部相片

Fig. 4 Other condition: Invert was found broken.
圖四. 其他狀況: 行水破裂