



# SAHTECH 年報

Annual Report

## 2022

**SAHTECH** 財團法人  
安全衛生技術中心  
SAFETY AND HEALTH TECHNOLOGY CENTER



## 財團法人安全衛生技術中心 2022 年報

### 沿革

財團法人安全衛生技術中心（SAHTECH）於 2007 年 1 月獲得主管機關勞動部（原行政院勞工委員會）審核認可，並於 2007 年 2 月經法院公證後，於 2007 年 3 月 1 日正式成立。本中心定位為安全衛生整合技術與管理系統服務提供者、為政府部會的優質智庫與產業永續發展的好伙伴、國際標準制定與推動者，並結合保險保全業創造客戶價值。本中心期許能成為亞太地區先進的安全衛生環保技術研發與創新服務機構。

本中心同仁學歷約有 18%博士、56%碩士，團隊成員安衛相關實務年資平均 20 年以上，領有工安技師與合格職業安全衛生專業證照者有 40%。主要研發與服務項目包含高科技安全、化學品安全、製程安全、機電安全、綠能安全、風險管理、安全節能、企業營運持續管理、環安衛管理、產物保險損害防阻、有害氣體監控、生物安全等設備開發、軟體設計與系統建置。

本年報印製日期 04.2023



## 經營團隊

### 創始捐助人

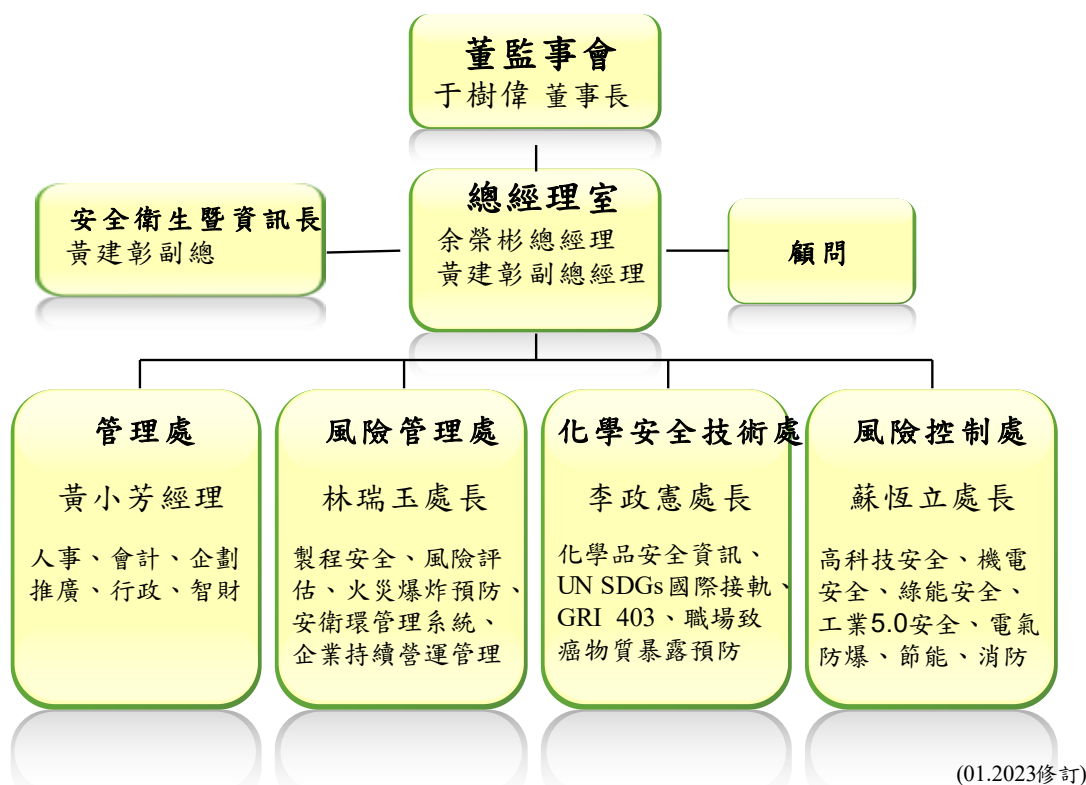
中華民國工業安全衛生協會  
李祖原聯合建築師事務所  
東京威力科創股份有限公司  
富邦產物保險股份有限公司  
漢民科技股份有限公司  
優貝克科技股份有限公司  
賴世龍先生（台北市工業安全衛生器材商業同業公會創會理事長）

### 第六屆 董監事成員（2022~2024）

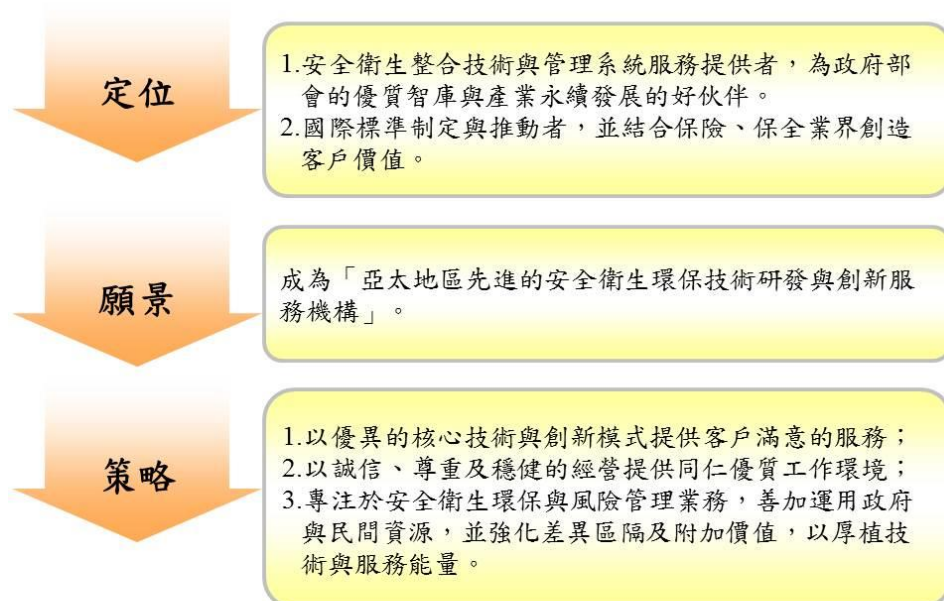
董事長 于樹偉博士（安衛中心董事長、前工研院環安中心主任）  
董 事 余榮彬博士（安衛中心總經理、前工研院環安中心副主任）  
董 事 傅武雄博士（前交通大學工學院副院長）  
董 事 戴基福先生（中華民國工業安全衛生協會榮譽理事長、前勞委會勞工安全衛生研究所長）  
董 事 施延熙先生（前工業局組長）  
董 事 林金穗先生（富邦產險公司資深副總經理）  
董 事 陳哲郎先生（李祖原聯合建築師事務所副總經理）  
董 事 陳文龍先生（前內政部消防署長）  
董 事 趙坤郁醫師（前衛生署國健局副局長）

常務監事 賴世龍先生（典試科技股份有限公司總經理、台北市工業安全衛生器材商業同業公會創會理事長）  
監 事 黃建彰博士（安衛中心副總經理、前工研院環安中心組長）  
監 事 陳俊瑜博士（前經國管理暨健康學院校長）

## 組織架構



## 經營理念



## 2022 經營績效

在新冠肺炎疫情擴大的 2022 年，財團法人安全衛生技術中心因應國際潮流，持續提供高品質的技術服務，協助政府推動職安衛永續發展、職場致癌化學品管理、化工製程安全、機電系統安全、小企業安全衛生改善等計畫。也利用委託服務協助半導體、面板顯示器、電子、機械設備、鋼鐵、石化、化材、製藥、物流及其他等相關企業，設計與營運朝向淨零排放更安全的設備、製程、工作環境與管理系統。本中心 2022 年配合政府委辦或自行舉辦之研討會與訓練班約 160 場，業界參與受訓人員合計約 16,500 人；臨場協助約 1,400 家事業單位，若加計本中心所協助的訪視輔導員，搭配臨場及線上輔導模式，約共協助 16,500 家事業單位。

為協助廠商展現風險管理及勞動照護相關績效，以展現企業永續經營企圖，本中心參考全球報告倡議組織之職業健康與安全揭露準則（GRI 403），協助勞動部職安署推動職場 SDGs 永續健康與安全發展計畫，辦理相關實踐論壇及責任供應鏈永續推動會議、研商電子業及金融保險業適用產業評量參考，並邀請 GRI 403 專案工作小組專家前美國安全工程師協會（ASSE）會長分享國際優良實務案例。本中心也提供 ISO 45001 職業安全衛生管理、ISO 31001 風險管理、ISO 22301 企業營運持續管理、GreenScreen®化學品綠色篩選等技術服務，協助企業展現 ESG 績效。本中心持續協助半導體廠之鄰近化學品循環減量回收設施的製程安全及防火安全設計，以協助高科技業順應 2030 年聯合國永續發展目標，其中包含溶劑、氫氣、重金屬、特殊化學品等。

本中心參考歐盟致癌化學物質管理架構，協助職安署執行行政院計畫，規劃修訂我國致癌化學物質管理相關法規，並臨場輔導事業單位 700 廠，也協助職安署在第二屆台歐職業安全衛生交流會持續分享成果。本中心協助職安署推動之相關業務包含優先管理化學品報備審查、管制性化學品許可管理、化學品商業機密保護等作業，以及擴充化學品資訊應用管理平台。

本中心持續協助政府相關部會擴建化學品管理制度並提升安全健康等保護績效，並多次於歐盟、印尼、泰國等國際研討會及亞太經合會（APEC）中，分享我國化學品管理經驗。本中心協助衛福部國健署管理菸品中化學物質申報資料並更新管理網站，以及菸害防制法有關電子煙與加熱菸管理方案。協助經濟部工業局因應各國 REACH 法規及聯合國 SDGs 2030 永續目標，邀請美國清潔生產行動機構（Clean Production Action）執行長闡述化學品毒理安全篩選工具，也分享印度及歐盟最新化學品管理動態，幫助台灣廠商符合貿易出口國當地法規。本中心協助經濟部標準檢驗局研討日常用品中甲醛限值暨甲醛試驗法草案研擬，包含收集日本消



費性商品管理架構與化性限量要求之法規依據。本中心持續參與農委會化學農藥十年減半計畫，落實農藥分級管理制度，協助廠商依國際最新標示規範全數完成換證，並開辦施藥安全防護種子師資班。

本中心協助職安署推動石化及使用化學品工廠製程安全管理輔導，分享運用 AI 新科技強化管理及防災作為，以消滅重大火災、爆炸或毒氣外洩事故。協助修訂甲類工作場所製程修改之安全評估實務參考手冊及製程安全管理程序參考手冊，並參考 API RP 571 建立 66 種設備管線常見之損壞機制及對應檢測方法資料庫供事業單位線上查詢。今年度提供石化業設備管線腐蝕劣化及製程安全評估技術輔導計 90 家，其中包含模擬分析外洩或火災爆炸之後果。本中心也辦理製程安全評估人員訓練，包含勞動檢查員約 20 名，另辦理事業單位內部稽核員訓練約 60 人。

製程安全技術對半導體相關科技業之服務，包含矽甲烷、過氧化氫、氫氣、氯氣、禁水性物質、異丙醇等供應或回收系統、廢水氮氮回收之相關製程後果模擬、防爆區域劃分及安全控制。而石化與其他傳產之安全服務，包含液氨、丙烯腈、酚、其他特定化學物質及公共危險品之製程、設備或儲存場所的量化風險評估與改善設計。本中心持續與工研院材化所合作，以腐蝕防護、危害與可操作性分析、故障樹分析、儀錶系統安全完整性等級 (SIL)、保護層分析 (LOPA) 等技術服務客戶。也提供製程安全評估、擴散模擬、變更管理、機械完整性、內部稽核與訓練等服務。

本中心協助職安署輔導事業單位改善高風險機械與系統之工作環境，包含加強工業用機器人協同作業安全等工業 4.0 安全，合計約協助 300 廠次生產環境及自動化產線之安全衛生加強。並持續與工研院綠能所合作，提供防爆電氣設備安全諮詢及現場輔導改善，包含燃氣鍋爐場所防爆區劃，合計約協助 70 廠。本中心也參與內政部消防署各類場所消防安全設備設置標準之修訂，包含鋰電池設施之消防安全。

本中心提供潔淨室安全技術服務，包含利用三維流場模擬火災煙霧控制策略及人員避難模擬、佈設製程區化學危害偵測系統、以智能通風消滅潛在缺氧危害、以紅外光譜儀量測技術調整製程機台與化學排氣櫃較適安全節能排氣、以國際消防與產險標準精進廠房安全等。設備與廠務安全服務則包含 SEMI S2、S10、S18、S22、S23 與 S26 評估、機台防震、設備源頭安全設計等。本中心也擴大參與科技廠海外廠房的化學品合規性諮詢及建廠安全協助。

本中心提供電氣安全、化學品暴露評估、職業健康管理等工業服務，協助客戶提昇安衛環、消防與能源管理績效，技術工具包含電力荷載紅外線熱影像、設備接

地電阻、超音波測漏、職衛暴露危害等量測或評估。本中心與工研院材化所及大學合作，利用成份分析、火災鑑定、事件樹分析、反應組合不相容性分析法等技術及自有之軟體工具，協助產物保險公司調查理賠案件，包含自動物流倉儲、半導體廠、設備廠、石化廠、製藥廠等，也包含鋰電池設施、太陽光電設施、VOC 濃縮轉輪等。本中心也協助廠商因應國家化學品管理制度提交環保署化學局之化學品安全評估報告，包含定量毒理推估 QSAR 與 read-across，累計已約有 85 份報告經審查獲准通過。

本中心持續協助約 920 家通過 TOSHMS 驗證的事業單位提升職安衛管理績效，也協助職安署修訂職業安全衛生顧問服務管理手冊規範。改善工作環境計畫包含訓練與支援縣市政府及約 470 位輔導人員，使其能對約 1 萬家 100 人以下之小企業（87% 為勞工數 30 人以下）提供約 15,000 場次臨廠職安衛危害改善輔導，包含僱用較多外籍移工之事業單位；持續製作外籍移工安衛教育訓練教材及海報，以供下載。本中心協助國科會新竹科學園區管理局培訓職業安全衛生及風險管理實務人員，也協助中華郵政、工研院等機構提升安全文化並增進工作場所安全衛生。

本中心為推廣安全衛生應用技術與管理實務，2022 年舉辦之研討會與訓練班內容涵蓋職場永續健康與安全 SDGs 揭露實務、應用 AI 提升環安衛風險監控、智慧化工廠數位安全管理、製程安全管理、製程安全管理內部稽核員訓練、製程變更管理及啟動前安全檢查實務、設備管線腐蝕劣化評估機制及檢測實務、火災爆炸危害預防、全球化學品法規管理及因應、化學品源頭廠商危害資訊管理、職場致癌化學物質危害預防、安全資料表查核、化學品危害分類標示與通識、化學品分級管理、廠場化學定量暴露評估、優先管理化學品之指定及運作、菸品資料申報、防爆安全、燃氣鍋爐與防爆電氣設備、防爆電氣配線施工與監工、防爆危險區域劃分、機電系統安全與風險評估、自動化產線安全、協同作業機器人安全評估、企業營運持續管理、職業安全衛生管理績效、風力發電業勞工安全意識提升、外籍移工職業安全衛生管理實務、ISO 45003 職場心理健康風險與關懷、CNS 45001 職安衛管理系統與促進會係列研討、縣市中小企業工作環境改善與安衛家族訓練等。

本中心網站及幫政府經營的計畫網站，如中小企業安全衛生資訊網、台灣職業安全衛生管理資訊網、廠場化學品重點管理資訊網、國際化學品政策宣導網、農藥標示暨 GHS 化學品全球調和制度資訊網、GoChem 企業化學品管理資訊網、製程安全管理資訊應用與交流平台、臉書粉絲專頁等，每月瀏覽人數約 250,000 人。也定期發行國際化學品法規電子短訊、中小企業安全衛生電子報等，利用電子郵件、行動通訊 APP 與網路社群分享新知。



本中心積極贊助、參與安全衛生永續技術相關公益促進活動，如職業衛生暨職業醫學與護理國際學術研討會、台灣安全文化學術論壇、台北國際安全科技應用博覽會暨工業安全與管理研討會、台灣化學產業協會高峰論壇暨展會、超臨界流體國際研討會、亞洲氣膠學術研討會、光觸媒研討會等。本中心也積極參與相關產協會活動，並向國內相關主管機關提出建言。本中心頒贈第五屆「財團法人安全衛生技術中心獎學金」，獎勵 12 位大專院校學生修習安全衛生相關課程及參與相關專題或論文研究。

本中心 2022 年員工約 48 人，約執行 1.6 億元委託案，其中約有 50% 的經費來自業界。附件一為本中心 2022 年大事紀，附件二則為政府主要委託計畫之執行摘要，業界委託計畫則因保密協定未列於年報中。業界客戶除數家知名顧問公司及國際產物保險與公證公司外，也包含台積電、美光、南亞科技、華邦、群創光電、光寶集團、達信、台灣應材、東京威力、漢民科技、京元電子、中華精測、優貝克、英特格台灣、漢鐘真空、漢辰、是德科技、盟立自動化、鈦昇科技、奇鈦、晁晟奈米、聯合再生能源、南亞塑膠、台化纖維、奇美實業、長春石化、長興材料、永光化學、勝一化工、東邦塗料、台灣波律、台耀化學、有郁實業、天弘化學、金隆化學、元鴻材料、日立先端、中華化學、亞東氣體、旭富製藥、法蘭摩沙、中鴻鋼鐵、沃旭能源、台灣猛獁象起重、水之源、立盈環保、成信實業、傑智環科、關貿網路、中華郵政、板橋郵局、晨宇物流、台北捷運、佳辰科技、住華顧問、知性國際、工研院、成大等，以及美中日等資通訊、面板與化材大廠。

本中心一本「關懷安全衛生永續、回饋安全衛生永續」之理念，除積極協助政府推動相關工作，以及協助產業界提升技術能量與發展產業自發之安全衛生與永續發展指引外，並將持續贊助相關公益事務，期能善盡企業社會責任。

## 活動照片



2022.02 APEC SOM I CD 會議-李政憲處長(上)、陳佳君主任工程師(下)



2022.04 鋼構業安衛家族成員安全衛生臨場輔導-張家翰主任工程師(中)



2022.04 與媒體業聯合辦理 2022 工業安全與管理年會-于樹偉董事長(中)



2022.04 中小企業工作環境輔導改善中區輔導員訓練-林瑞玉處長(前排右)



2022.04 於 2022 職業衛生暨職業醫學與護理國際學術研討會辦理 SDGs 與職業健康績效論壇-余榮彬總經理(左五)、李政憲處長(右三)、職安署張國明組長(右四)、職業衛生學會陳歡瑜理事長(左四)



2022.07 保護層分析技術輔導-林敬凱資深技術經理





2022.07 變更管理及啟動前安全檢查實務教育訓練-張福慶資深技術經理(右)



2022.08 化工化學材料業界溫室氣體排放教育訓練-李政憲處長(立者)



2022.08 產業協會製程安全管理交流-林瑞玉處長(左立)、戴啓夫博士(右立)



2022.08 防爆施工班-林慶峰資深技術經理(右)、張文昇主任工程師(左)



2022.08 縣市政府專責人員職業安全衛生多體感延伸實境(XR)防災模擬訓練



2022.08 北捷萬大線潛盾工程 TOSHMS 訪視座談-陳碧婷資深主任工程師(右二)



2022.08 APEC SOM III CD 會議-李政憲處長(前排右一)



2022.09 協同作業機器人安全評估說明會-邱祺文工程師





2022.09 永續實踐論壇-職場健康在企業 ESG 扮演的角色-余榮彬總經理(左四)、職安署彭鳳美副組長(左五)、方澤沛博士(右三)



2022.09 勞動檢查員製程安全管理實務訓練-邱柏誠主任工程師



2022.09 供應鏈職場安全與健康永續推動說明會-職安署鄒子廉署長(中)、李政憲處長(右立)



2022.09 石化業集團製程安全管理專班集體輔導



2022.10 林園工業區製程安全管理推動實務觀摩會-林瑞玉處長(前排右一)



2022.10 台酒公司屏東酒廠防爆輔導-張文昇主任工程師(中立)





2022.10 全球化學品法規管理及因應策略宣導說明會- 林以辰博士



2022.11 石化及化學品業製程安全管理臨廠輔導-戴啟夫博士



2022.11 111 年度第 2 次董監事會議合影



2022.11 農藥標示樣張形式產出工具操作說明會-陳佳君主任工程師(右一)



2022.11 石化及使用化學品工廠製程安全管理臨廠輔導-丁憶淇主任工程師(左一)、李全資深主任工程師(右一)



2022.11 齒輪(哈雷機車零件)加工自動化產線示範觀摩會-蘇恆立處長(右立)、邱祺文工程師(左立)





2022.11 農藥施用安全防護訓練種子師資班



2022.11 職場永續健康與安全國際研討會-余榮彬總經理(左二)、職安署鄒子廉署長(左五)



2022.11 職安署職業安全衛生永續發展聯合成果發表會



2022.11 職安署職業安全衛生永續發展聯合成果發表-科技防災應用展演



2022.12 TOSHMS 北中南三區促進會成果發表會



2022.12 政府機關推動職安衛績效評核優良縣市暨五星獎頒獎典禮



## 附件一 財團法人安全衛生技術中心 2022 年大事紀

日期	大事紀
1 月	<ul style="list-style-type: none"> <li>● 執行職安署委託之廠場化學品危害預防管理計畫。</li> <li>● 執行職安署委託之廠場 CMR（致癌性、致突變性、生殖毒性）化學物質暴露預防計畫。</li> <li>● 執行衛福部國健署委託之菸品資料申報暨菸品成分網站管理計畫。</li> <li>● 提供產物保險公證人及法院之火災事故調查服務。</li> <li>● 提供智能中央倉儲安全整合顧問技術服務。</li> <li>● 提供某電子大廠海內外廠區營運持續管理系統技術輔導服務。</li> </ul>
2 月	<ul style="list-style-type: none"> <li>● 執行工研院轉委託經濟部工業局之國際化學品管理 REACH 策略推動計畫。</li> <li>● 與工研院共同執行職安署委託之補助中小企業新購檢定合格防爆電氣設備計畫。</li> <li>● 執行農委會委託之推動我國農藥標示暨施用安全防護精進管理計畫。</li> <li>● 協同職安署參加泰國曼谷亞太經合會（APEC）化學對話 SOM I CD 視訊會議。</li> </ul>
3 月	<ul style="list-style-type: none"> <li>● 執行職安署委託之政府機關推動職業安全衛生績效評核及輔導作業計畫。</li> <li>● 執行職安署委託之我國職業安全衛生管理制度推動業務計畫。</li> <li>● 執行標檢局委託之日常用品中甲醛限值研析暨甲醛試驗法草案研擬計畫。</li> <li>● 執行某生技製藥廠建廠之防爆電氣與製程安全技術服務計畫。</li> <li>● 提供企業永續發展策略暨永續報告編撰與溫室氣體盤查輔導服務。</li> <li>● 執行高科技廠零廢中心安全整合顧問輔導。</li> </ul>
4 月	<ul style="list-style-type: none"> <li>● 執行勞動部職安署委託之中小企業改善工作環境及促進就業服務統籌支援計畫。</li> <li>● 執行職安署委託之推動職場永續健康與安全發展計畫。</li> <li>● 執行職安署委託之石化及使用化學品工廠製程安全管理輔導計畫。</li> <li>● 執行新竹科管局委託之園區安全衛生人員精進計畫。</li> <li>● 協助 2022 職業衛生暨職業醫學與護理國際學術研討會辦理 SDGs 與職業健康績效論壇。</li> <li>● 協助第 23 屆台北國際安全科技應用博覽會辦理工業安全與管理研討會。</li> <li>● 頒贈第五屆獎學金給 12 位大專院校學生。</li> </ul>
5 月	<ul style="list-style-type: none"> <li>● 執行職安署委託之輔導高風險、高職災、高違規（3 高）之事業單位改善安全衛生工作環境計畫。</li> <li>● 執行職安署委託之高風險事業單位製程安全資料庫與評估技術建置計畫。</li> <li>● 協助職安署辦理事業單位響應 SDGs 職場健康與安全 ESG 主流化-合作夥</li> </ul>

日期	大事紀
	伴共識會議。 ● 2022 年第一次董監事會。
6 月	● 參與晶圓代工廠美日建廠之化學品安全顧問服務。 ● 輔導某電子大廠建置網路安全管理與緊急應變整合計畫。
7 月	● 執行半導體廠廢氫循環再利用計畫。
8 月	● 協同職安署參加泰國清邁亞太經合會 (APEC) 化學對話 SOM II CD 會議。
9 月	● 協助標檢局收集日本消費性商品管理架構與化學性限量要求之法規依據與我國作法差異。 ● 協同職安署視訊參與於印尼峇厘島舉辦之亞洲職業衛生聯盟 (ANO) 學術研討會，並發表論文兩篇。
10 月	● 協助工業局辦理全球化學品法規管理及因應策略宣導會，邀請美國清潔生產行動機構 (CPA) 執行長與瑞士工安協會分享最新趨勢。 ● 參與消防署修訂各類場所消防安全設備設置標準。
11 月	● 協助職安署辦理 SDGs 永續健康與安全國際研討會，邀請 GRI 403 專案工作小組專家前美國安全工程師協會 (ASSE) 理事長分享最新趨勢。 ● 協助職安署辦理製程安全管理、產業自動化安全、中小企業安衛改善聯合成果發表會。 ● 執行鋰電池儲能站安全深化輔導。 ● 2022 年第二次董監事會。
12 月	● 協助職安署辦理職安衛五星獎頒獎典禮暨職業安全衛生管理 TOSHMS 促進會聯合成果發表會。 ● 辦理製程安全管理內部稽核人員證照訓練班。 ● 年度結算約舉辦研討會與訓練班約 160 場，受訓學員約 16,000 人。親自或訓練輔導員臨廠輔導 16,500 廠次。 ● 全職員工 48 人。年度結算約執行 1.6 億元委託案，其中約有 50% 的經費來自業界。

## 2022 SAHTECH Report

April 2023

### About SAHTECH

SAHTECH, a non-profit organization, was founded in 2007 with donations from Industrial Safety and Health Association of R.O.C. (Taiwan), CY LEE & Partners Architects, Fubon Insurance Co., Hermes Epitek Co, Tokyo Electron Ltd., ULVAC, and Mr. Tony Lai. SAHTECH aims to be a major player in the field of safety, health and environment (SHE) technology and services in the Far East. It is noteworthy that 18% of SAHTECH staff hold Ph.D. degree, and 56% have master's degree. Among them, 20% of them are graduates of internationally renowned universities. Many of them are certified safety professionals, certified industrial hygienists, certified occupational safety and health (OSH) management specialists, certified functional safety engineers, certified ISO 45001 lead auditors, and certified ISO 50001 lead auditors. Our highly experienced specialists provide complete range of SHE services to clients. In average, people working in SAHTECH have about 20 years of OSH experiences.

### Board of Directors (2022~2024)

- Dr. Shuh Woei Yu (Chairman of SAHTECH; ex-Director General of Center for Environmental, Safety and Health Technology Development (CESH), Industrial Technology Research Institute (ITRI))
- Dr. Jung-Pin Yu (President of SAHTECH; ex-Deputy Director General of CESH, ITRI)
- Dr. Wu-Shung Fu (ex-Deputy Dean of Engineering College, National Chiao Tung University)
- Mr. Ji-Fu Dai (ex-Director General of IOSH, Ministry of Labor)
- Mr. Xi ShihYuan (ex-Director, Industrial Development Bureau, Ministry of Economic Affairs)
- Mr. Jin-Sui Lin (Senior Vice President of Fubon Insurance Co.)
- Mr. Je-lang Chen (Vice President of CY LEE & Partners Architects)
- Mr. Wen-Long Chen (ex-Director General of National Fire Agency, Ministry of Interior)
- Dr. Kun-Yu Zhao (ex-Deputy Director General of Health Promotion Bureau, Ministry of Health)



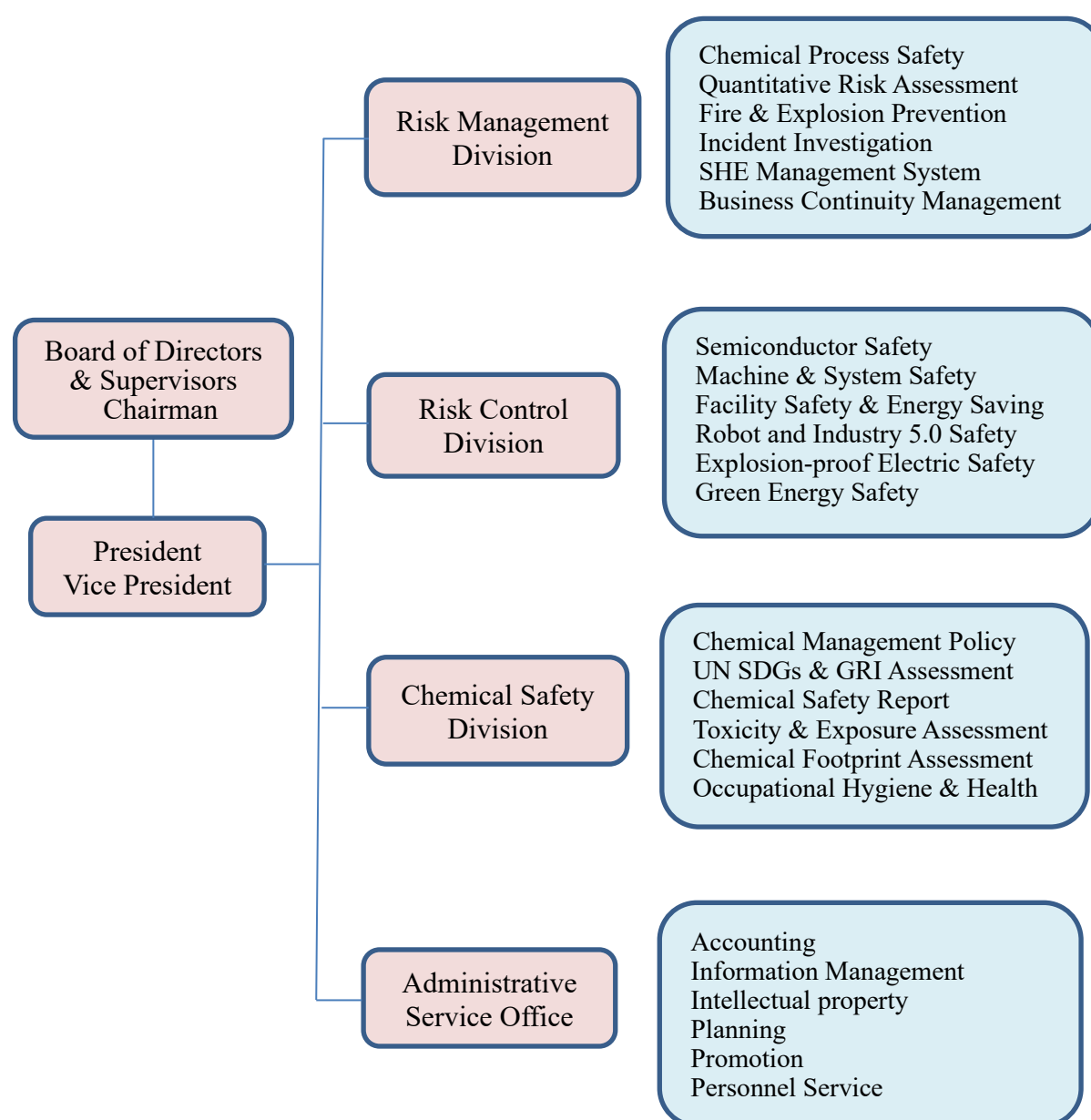
## Board of Supervisors (2022~2024)

Mr. Tony Lai (Standing Supervisor of SAHTECH ; President of Data Test Scientific, founding Chairman of Taipei Industrial Safety & Hygiene Product Commerce Association)

Dr. Chun-Yu Chen (ex-President of Ching Kuo Institute of Management & Health)

Dr. Cheng-Chang Huang (vice President of SAHTECH; ex-Director of CESH, ITRI)

## Organization Chart



01.2023

## Achievements

SAHTECH continues to provide high value-added professional services in response to international trend of SDGs despite the expanding COVID pandemic in 2022. As an essential think-tank for Taiwan government agencies and a technical partner for industries, SAHTECH has facilitated the basic regulatory implementation of chemical management, chemical process safety, and machine system safety. SAHTECH has worked closely with government to deliver occupational safety and health (OSH) capacity-building assistance to micro and small enterprises (MSEs). SAHTECH has also leveraged proven technologies and practices to provide healthier and safer technical assistance and management systems to industries.

SAHTECH assisted MOL OSHA to encourage Listed companies and Initial Public Offerings companies promoting OSH related activities and responsible value chain management of SDGs. More than 30 companies of electronics and finance, followed the OSHA's sector's guidance of GRI 403: Occupational Health and Safety, were honored for reporting excellent performance of OSH, labor conditions and social responsibility. Expert from the GRI 403 project working group, former president of the American Society of Safety Engineers (ASSE), was invited to share international good practices. SAHTECH also provided technical services such as ISO 45001 OSH management, ISO 31001 risk management, ISO 22301 business continuity management, and chemical GreenScreen® to help companies demonstrate ESGs performance. SAHTECH continued to assist semiconductor factories in the safety design of chemical recycling facilities, adjacent to the factory, to comply with the 2030 United Nations SDGs, including solvents, hydrogen, heavy metals, specialty chemicals, etc.

SAHTECH also assisted OSHA launching the national project of occupational carcinogens, and 700 factories handling CMR substances received on-site consultations in 2022. SAHTECH operated the Chemical Management Office on behalf of OSHA. It played an important role in mobilizing technical supports to facilitate the collective national chemical management scheme. SAHTECH assisted OSHA to implement required-submit priority chemical management, controlled chemical permission, proprietary confidential business information (CBI) protection, etc. SAHTECH accompanied OSHA participating the APEC Thailand Meeting of Chemical Dialogue. Acting as the GHS

implementation focal point of Taiwan, SAHTECH hosted the APEC GHS Gateway Website for sharing labelling elements in 38 languages, a.k.a. the G.R.E.A.T. Project on behalf of MOL.

SAHTECH served as a special-task office of tobacco additive notification management and toxicity information examination for the Health Promotion Administration of Ministry of Health and Welfare, including electronic cigarettes and heated tobacco products. SAHTECH assisted the Industrial Development Bureau (IDB) of the Ministry of Economic Affairs (MOEA) in response to the REACH regulations of various countries. SAHTECH shared industry the latest chemical management trends in India and the European Union, and also invited the CEO of Clean Production Action to introduce the toxicological safety screening tools for chemicals. SAHTECH helped the Bureau of Standards, Metrology and Inspection (BSMI) of MOEA studying the general rules on formaldehyde limit value in daily necessities and draft of formaldehyde test method. SAHTECH also collected the related regulatory basis for the Japanese consumer product management framework and chemical limit requirements. SAHTECH continued participating in the ten-year plan of the Council of Agriculture to halve chemical pesticides, and to assist the implementation of the pesticide classification management system. SAHTECH assisted manufacturers to complete the renewal of certificates in accordance with the latest international labeling standards and set up train-the-trainer courses for pesticide application safety. SAHTECH also provided OSH trainings for the Hsinchu Science Park Administration Bureau of the National Science and Technology Council.

SAHTECH helped OSHA promote the safety management guidance of petrochemical and semiconductor factories, sharing the use of new AI technology to strengthen management and disaster prevention, so as to reduce major fire, explosion or toxic gas release accidents. The reference manuals of safety assessment practice and procedure for process modification in Category A workplaces were revised. Common damage mechanisms and corresponding detection methods database of 66 equipment and pipelines, referred to API RP 571, were available for online inquire. Ninety factories received on-site consultation on petrochemical industry equipment pipeline corrosion degradation and process safety assessment technical guidance, including simulation analysis of leakage or fire and explosion consequences. SAHTECH



also delivered PSM assessment training to industries, including 20 labor inspection officers.

SAHTECH helped OSHA conduct on-site consultation to improve the explosion-proof electrical equipment safety of 70 factories, including the explosion-proof zoning of gas boiler sites, by collaborating with the Green Energy and Environment Research Laboratories of ITRI. The safety of potential high-risk machinery and systems, including human-machine collaborative robots, and 300 factories and 50 automated production lines were also assisted.

SAHTECH helped OSHA monitor the performance of TOSHMS, the enhanced version of ISO 45001. Around 920 organizations retained certificates in 2022, where 10%, 17%, 16% and 57% of them were composed of less than 100, 100~200, 200~300 and more than 300 workers, respectively. Three TOSHMS Families have been organized and in operation, with the help from SAHTECH, to share OSH best practices during the pandemic, such as ISO 45003 occupational psychosocial safety, AR/VR training, electronic fence for high-risk workplaces and AI for high-risk operations.

SAHTECH helped OSHA facilitate all 22 local governments to provide basic OSH services to MSEs through the Dandelion Rooted Project. With the help of 470 OSH professionals, around 10,000 MSEs with less than 100 workers, where 87% were less than 30, were provided with on-site assistance in 2022. For the past 14 years, statistics indicated that the average accident rate of the MSEs was reduced by 22.8% after receiving assistance for 2~3 years, while the reduction of general industries was 8.5 %. Some companies were also grouped into 233 regional Dandelion Families. OSH awareness of young workers and migrant workers was assisted by the SAHTECH mainly through this project.

In 2022, SAHTECH delivered more than 160 professional OSH trainings/seminars to around 16,500 trainees. Websites managed by SAHTECH had around 250,000 visits monthly, and e-newsletters of MSEs OSH and chemical management were regularly distributed, including e-community media and mobile application software.

The premium contracts, both from the private and public sectors, bolstered SAHTECH's strategic sustainability, safety, health and environment (SHE) technology service position in Taiwan. Numerous chemical, ICT, LED, machinery, material, printed circuit board, semiconductor, steel, TFT-LCD

companies, and service sectors received SAHTECH's technical services in 2022. Innolux, Lite-on Group, Manz AG Taiwan, Micron Taiwan, Nanya Technology, Taiwan Apple, tsmc, Winbond, ACR Tech, Applied Materials Taiwan, Chunghwa Precision Test Tech, Entegris Taiwan, E&R engineering, Hermes Epitek, Hitachi Hightech Taiwan, Keysight Technologies, Mirle Automation, Tokyo Electron Taiwan, ULVAC Taiwan, Air Liquid Far Eastern, Chang Chun Petrochemical, Chimei Corp., Chin Ching Group, Chitec Technology, Chung Hwa Chemical, Donbon Paints, Eternal Materials, Everlight Chemical, Formosa Chemicals & Fibre, Formosa Laboratories, Framosa Co., Nanotech, Nan Ya Plastics, Rich Yu Chemical, SCI Pharmtech, Shiny Chemical, Uranus Chemicals, Chunghung Steel, Ørsted, United Renewable Energy, Ecove Environment, JG Environmental, Liying Environmental, Transcene Recycling, WaterPark Environment, Mammoet Taiwan, Taiwan Maxwave, Banqiao Post, Chunghwa Post, Chenyu Cargo & Freight, Taipei Metro, Trade Van Information Services, ITRI, NCKU, DG Special, Jointek Technology, Marsh Taiwan, McLaren Taiwan, Sedgwick Hong Kong Limited, and Sumika consulting, etc. were some of SAHTECH's clients in 2022. Notable technology activities are summarized below.

### **High-Tech Safety Services in Electronics Related Industries**

SAHTECH helped clients, in Taiwan and abroad, design safer facilities to meet international guidelines, codes and standards, such as API, ASME, FM, NFPA, SEMI, etc. Significant emerging technical services of year 2022 included safety design of zero waste centers of science parks and US/Japan plants for an internationally renowned IC foundry were also delivered. Safety review of process tools and local scrubbers were provided. 3-D flow pattern simulation, personnel escape simulation, maximum foreseeable fire loss assessment, smoke control system, water mist system, explosion proof zoning, super-sonic leak detection, toxic gas monitoring system, and infrared thermo-image were commonly utilized in life safety and calamity control projects. Seismic vibration force minimization and anchor strength services were also provided for tools in the cleanrooms.

Safety review and control measures for the processes involving bulk hydrogen, hydrogen peroxides, air-sensitive hydrides, chlorine, and waste isopropanol recovery systems were delivered. SAHTECH also participated in the process safety and fire safety design of the chemical recovery facilities

adjacent to semiconductor factories to assist the high-tech industry achieve the 2030 United Nations Sustainable Development and the 2040 circular economy Goals, including solvents and hydrogen.

## Mechanical and Electrical Safety Services

SAHTECH provided contracted services of electromechanical safety and explosion zoning, especially for chemical, electronics and semiconductor industries. Taiwan Safety mark (TS mark), grounding resistance, electromagnetic radiation measurement and explosion-proof, were frequently conducted in the services of equipment sign-off procedures. SAHTECH also provided installation training for 60 explosion-proof electric professionals and 30 engineering supervisors in 2022.

## Process Safety Management Services

Process safety assessment, management of change, and competence courses were offered to more than 300 engineers. Utilizing Hazard and Operability Study (HazOp), Layer of Protection Analysis (LOPA), Safety Integrity Levels (SIL), Safety Instrument System (SIS), AIChE PSM guidelines, ASME guidelines, IChemE guidelines, and SEMI S10, SAHTECH helped industrial clients in chemical, electronic and steel industries mitigate risks, and to meet the requirement of Taiwan OSHA regulations.

SAHTECH often cooperated with the Material and Chemical Research Laboratories of ITRI to provide comprehensive risk control measures of equipment and piping corrosion. Quantitative safety risk assessment of liquid ammonia, hydrogen, phosphine and silane processes were also delivered. Run-away reaction testing and software of process hazard analysis, ASTM reactive and flammability hazards CHETAH, and computational-fluid-dynamics explosion and dispersion modelling were commonly used. Major clients included Air Liquid Far Eastern, Chang Chun Petrochemical Co., Formosa Plastics Group, Innolux, Micron Taiwan and tsmc.

## Accident Investigation Services

SAHTECH was also involved in the revision of the standard for installation of fire safety equipment based on use and occupancy set by the National Fire Agency of Ministry of the Interior, including fire safety for lithium battery facilities. SAHTECH provided contracted accident investigation reports to



numerous public notary companies and property insurers in 2022. Taiwan legal courts often consulted SAHTECH as a professional body regarding industrial accident and property loss.

Fire simulation modeling, sequentially timed events plotting, events and causal factors charting, why-tree analysis and some retro-fit laboratory tests were commonly incorporated in these reports. Services were also provided to mega logistics warehouses, semiconductor fabs, IC packaging factories, chemical factories, pharmaceutical plants, rooftop solar photovoltaic system installations, etc. Accident investigation seminars were also delivered.

### **Chemical Safety Information and Exposure Assessment Services**

SAHTECH actively assists companies to implement comprehensive chemical management practices through in-depth recommendations and action plans for responsible production and safer chemical substance substitution. Contracted services were provided to numerous international chemical companies to comply with Taiwan's chemical regulatory requirements, such as chemical safety report (CSR) for the EPA requirements of priority existing chemicals (PECs) and around 85 documents of CSR were officially approved. Some local chemical export companies contracted SAHTECH to help them prepare the REACH-like-regulation documents for other countries and the international chemical treaties. Services also included chemical toxicity assessment and advanced chemical control banding for occupational mixtures' exposure.

A series of proprietary chemical exposure and health management software was widely used in manufacturing industry, construction industry, transportation sector, universities, financial holdings, and other service industry in 2022. Local firms also regularly received international regulation updates through SAHTECH e-message service. SAHTECH also presented exposure assessment and chemical management papers in the conference of 2022 Asian Network Occupational Hygiene, Indonesia.

### **OSH Management and Business Continuity Management Services**

SAHTECH continues providing construction safety services to major contractors of Ørsted's offshore wind farms. Contracted services of the establishment of OSH management system, safety culture and job safety

analysis were delivered. Risk assessment packages and trainings were also provided to industries, including biosafety and OSH management. Business Continuity Management (BCM) was delivered to semiconductor and electronics companies.

### Professional Societies Sponsorship

SAHTECH sponsored numerous technical conferences and professional activities with regards to occupational safety and health, fire protection, environmental protection, and green technology, such as those of Taiwan Occupational Hygiene Association, Taiwan Safety Council, Taiwan Chemical Industry Association, Taiwan Aerosol Research Association, Taiwan Super Critical Fluid Association, and Taiwan Photo-catalyst Industrial Association.

Twelve distinguished students received SAHTECH scholarship to explore the field of OSH study and research in 2022. SAHTECH had 48 full-time employees and the revenue generated was around 5.2M USD, with 50% from industrial contract services.

SAHTECH looks to the future and more successful years ahead. As a responsible organization, SAHTECH will continue to advance and fully provide our expertise to promote SHE technologies, to help clients comply with international standards, to actively engage in professional SHE societies, and to serve as technical support to government agencies.



## Photo Gallery



02.2022 APEC SOM I chemical dialogue webinar- Director Dr. Jowitt Li (up L) and Project Manager Cha-Chin Chen (low R).



04.2022 On-site OSH assistance for a steel structure plant, Specialist Chia-Han Chang (C).



04.2022 Chairman Dr. Shuh Woei Yu (C) hosted industrial safety and management seminar at 2022 Taipei Fire Expo.



04.2022 Counselor training of MSEs on-site OSH assistance project- Director Jui-Yu Lin (R of 1<sup>st</sup> row).



04.2022 President Jung-Pin Yu (L5) hosted SDGs forum at TOHA conference-Director Jowitt Li (R3) and Professors of TOHA.



07.2022 Project Manager Jing-Kai Lin conducted process protection layers training.





07.2022 Management of change and pre-startup safety review training- Senior Project Manager Fu-Ching Chang (R1).



08.2022 Director Dr. Jowitt Li (far C) delivered greenhouse emission reduction training for a specialty chemical factory.



08.2022 SAHTECH hosted Industrial association dialogue on process safety management regulations.



08.2022 Senior Project Manager Ching-Fong Lin (R) and Senior Engineer Wen-Sheng Chang (L) conducted Explosion-proof electrics installation workshop.



08.2022 AR/VR safety training for county OSH officers- Director Jui-Yu Lin (R5 of 1<sup>st</sup> row).



08.2022 TOSHMS visit at a shield engineering tunnel of Taipei Metro- Project Manager Piting Chen (R2).





08.2022 APEC SOM III chemical dialogue meeting, Chiang Mai, Thailand- Director Dr. Jowitt Li (R1).



09.2022 Safety assessment seminar on collaborative robots- Engineer Chi-Wen Chiu.



09.2022 SDGs Forum on occupational health and ESG- President Dr. Jung-Pin Yu(L4).



09.2022 Process safety training for OSHA inspectors- Engineer Bo-Cheng Chiu.



09.2022 SDGs Forum on supply chain OSH management- Director Dr. Jowitt Li (stand at R) and OSHA Director General Dr. Tzu-Lien Tzou (C, front seat).



09.2022 Process safety management training for a petrochemical group.





10.2022 Process safety management site-visit at a petrochemical plant- Director Jui-Yu Lin (R1 of 1<sup>st</sup> row).



10.2022 Senior Engineer Wen-Sheng Chang (C) provided explosion-proof zoning assistance for a winery.



10.2022 Dr. Steve Lin hosted Global chemical regulations management and response strategies seminar.



11.2022 Dr. Chi-Fu Dai (C) provided piping safety assistance.



11.2022 Board meeting of directors and supervisors.



11.2022 Pesticide labeling training-Project Managers Cha-Chin Chen (R1).





11.2022 Process safety auditing at a chemical plant- Project Manager Chyuan Lee (R1) and senior engineer Yi-Chi Tin (L1).



11.2022 Safety sharing workshop at a gear processing automation production plant (Harley motorcycle parts)- Director Heng-Li Su (far R1, stand).



11.2022 Train the trainer workshop on personal protective equipment.



11.2022 International SDGs and OSH seminar- President Dr. Jung-Pin Yu (L2) and OSHA Director General Dr. Tzu-Lien Tzou (L5).



11.2022 OSHA OSH annual conference assisted by SAHTECH.



11.2022 Big-data and intelligent sensing demonstration at OSHA OSH annual conference.



12.2022 OSHA TOSHMS annual conference assisted by SAHTECH.



12.2022 OSH excellent award ceremony of government agencies and five-safety-star enterprises, assisted by SAHTECH.

財團法人安全衛生技術中心

SAFETY AND HEALTH TECHNOLOGY CENTER

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