中国标准化研究院
CHINA NATIONAL INSTITUTE OF STANDARDIZATION

USTDA
U.S. TRADE AND DEVELOPMENT AGENCY

ANSI
American National Standards Institute

中美应急管理行业和标准线上研讨会
U.S.-China Emergency Management Industry and Standards Webinar

2020年7月28日
July 28, 2020

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U.S.-China Emergency Management Industry and Standards Webinar

July 28, 2020

8:30am – 12:00 pm (Beijing local time)

Location: Virtual platform – WebEx

8:30am – 8:45am	**Signing In**
8:45am – 8:50am	**Introduction** ▪ *Xu Fang, China Representative, American National Standards Institute (ANSI)*
8:50am – 9:10am	**Welcome Remarks** ▪ *Carl B. Kress, Regional Director, East Asia and the Middle East, North Africa, Europe and Eurasia, U.S. Trade and Development Agency (USTDA)* ▪ *Tang Wanjin, Vice President, China National Institute of Standardizations (CNIS)*
9:10am – 9:40am	**Overview of China's Emergency Management and Standardization** *Presenter: Mr. Qin Tingxin, Director of Public Safety Division, CNIS*
9:40am – 10:10am	**Overview of U.S. Emergency Management Standardization** *Presenter: Ms. Mary Mikolajewski, Technical Committee Manager, ASTM International*
10:10am – 10:20am	**Break and virtual networking**
10:20am – 10:50am	**Case Study: Prevention of Hazardous Gas Leakage and Best Practices for Operation and Maintenance** *Presenter: Mr. Henry Yu, General Manager of China; Vice President of Sales for the APAC region, Purafil*

10:50am – 11:20am	**Case Study: Production Safety Application and Equipment** *Presenter: Ms. Tian Lijuan, Engineer, Thermo Fisher Scientific*
11:10am – 11:35am	**Case Study: Risk Assessment Standards for Urban Safety** *Presenter: Mr. Zhang Chao, Assistant Researcher, CNIS*
11:35am – 12:00pm	**Guided Discussion and Q&A** ***Opportunities and challenges: Industry perspective*** *Moderator: Xu Fang, China Representative, ANSI* ▪ *Zou Liang – U.Protec* ▪ *Mark Ou – 3M* ▪ *Wallace Lee – Altec*
12:00pm	**Adjourn**

U.S.-China Emergency Management Industry and Standards Webinar

Presenters' Biographies

July 28, 2020

Carl B. Kress (卡尔 • 克里斯)

美国贸易发展署
东亚、中东、北非、欧洲和欧亚大陆地区区域主管

Regional Director, East Asia and the Middle East, North Africa, Europe and Eurasia, U.S. Trade and Development Agency (USTDA)

Carl B. Kress is the Regional Director for USTDA's programs in the Middle East, North Africa, Europe, Eurasia and East Asia. As Regional Director, Mr. Kress is responsible for developing and implementing the USTDA economic development program throughout these regions. He is also Co-Leader of two of USTDA's worldwide sector teams, energy as well as for healthcare.

Before joining the agency in 2001, Mr. Kress held legal and legislative positions in government and the private sector. His previous experience includes serving as counsel at the U.S. International Trade Commission, as an attorney with the law firm McDermott, Will & Emery where he focused on international trade matters, and on the staffs of members of the U.S. Senate and House of Representatives.

Mr. Kress holds a B.A. degree from the University of California, Berkeley and also received his law degree from the University of California, Los Angeles. He also holds an LL.M. degree in German law from the University of Hamburg, Germany.

卡尔•克里斯是美国贸易发展署负责中东、北非、欧洲、欧亚和东亚项目的区域总监。作为地区总监，克瑞斯先生负责在这些地区制定和实施美国科技发展署的经济发展计划。他还是美国贸易发展署两个全球部门团队的联合领导者，这两个部门分别是能源和医疗保健部门。

在2001年加入该机构之前，Kress先生曾在政府和私营部门担任法律和立法职务。他以前的经历包括在美国国际贸易委员会担任律师，在麦克德莫特、威尔和埃莫里律师事务所担任律师，专注于国际贸易事务，以及美国参议院和众议院的工作人员。克里斯先生拥有加州大学伯克利分校的学士学位，并获得了洛杉矶加州大学的法学学位。他还拥有德国汉堡大学的德国法律法学硕士学位。

Wanjin TANG (汤万金)

Dr. Tang is the researcher and the Vice President of China National Institute of Standardization (CNIS). He is also the committee member and secretary-general of National Technical Committee for Sustainable Urban Development Standardization (SAC/TC567). In his major research field of quality management, he has completed more than 20 scientific research projects supported by government funding, social funds, industry and international cooperation progrommes. Dr. Tang has led the establishment of the AQSIQ Center for Defective Product Management and the CNIS Center for Customer Satisfaction Evaluation. He has published 8 books and 80 scientific and research papers, he was the recipient of the special government allowances awarded by the State Council in 2010.

中国标准化研究院
副院长

Vice President
China National Institute of Standardization (CNIS)

汤万金，研究员，中国标准化研究员副院长，全国城市可持续发展标准化技术委员会（SAC/TC567）委员兼秘书长。主要研究质量管理领域，完成包括国家支撑计划课题、国家自然科学基金项目、社会基金项目、行业公益项目和国际合作项目等科研课题20余项。组建“国家质检总局缺陷产品管理中心”和“中国标准化研究院顾客满意度测评中心”。论著8部，撰写科技论文80余篇。2010 年享受国务院政府特殊津贴。

Tingxin Qin (秦挺鑫)

中国标准化研究院
公共安全标准化研究所
副所长

Director of Public Safety Division, China National Institute of Standardization

Dr. Qin is the research fellow with China National Institute of Standardization (CNIS), and he also acts as the Director of the Public Safety Division and he is in charge of the standardization activities. In 2006, Dr. Qin started his career in CNIS as a researcher and standardization expert in the field of public safety and standardization strategy.

Dr. Qin also holds several other positions, such as the secretary-general of the National Technical Committee of Basic Standardization in Public Security (SAC/TC 351), member of the Technical Committee of Security and Resilience (ISO/TC292), academic leader in safety production for the municipal government of Beijing, committee member of the Beijing Safety Science and Technology Committee. In his area of expertise, Dr. Qin has led more than 10 national and industrial projects of public safety and emergency management, and contributed to the development of 10 related national standards. His other achievements includes the publication of 20 research papers and academic books.

秦挺鑫，中国标准化研究院公共安全标准化研究所副所长，兼任公共安全标准化领域负责人，研究员。2006年, 他进入中国标准化研究院从事公共安全和标准化战略领域的科研和标准化工作。任全国公共安全基础标准化技术委员会（SAC/TC 351）秘书长，国际标准化组织“安全与韧性”技术委员会（ISO/TC292）技术专家，北京市安全生产领域学科带头人，北京安全与工程学会委员。从事公共安全与应急管理标准化工作，主持参与国家和行业公共安全与应急领域科技项目10余项公共安全国家标准的研制工作，发表论文20余篇。

Chao ZHANG (张超)

中国标准化研究院
副研究员

Assistant Researcher,
China National Institute of Standardization

Dr. Zhang is an assistant researcher at the China National Institute of Standardization. His areas of research interest include emergency management theory and standardization, the techniques and standardization of risk analysis for urban safety.

He is the convener of the “SAC/TC 351/WG1 general standard of security and resilience”. He is the registered technical expert for “Safety and Resilience” Technical Committee (ISO/TC292), the Member of the "Risk Assessment Professional Committee" at the Society of Science and Technology, standardization expert of the China Standardization Innovation Strategic Alliance, and a distinguished researcher of the Key Laboratory of "Safety Protection Technology and Risk Assessment" at the the Ministry of Public Security. He has contributed to the development of 6 national standards, undertook or participated in more than 10 national and provincial scientific research projects, published 2 academic books, and more than 10 SCI/EI research papers.

张超是中国标准化研究院副研究员，其主要从事公共安全应急管理理论、公共安全标准化理论与实践研究。

他同时担任全国公共安全基础标准化技术委员会（SAC/TC351）“通用”工作组召集人，国际标准化组织“安全与韧性”技术委员会（ISO/TC292）技术专家及国内技术对口单位联系人，公共安全科学技术学会“风险评估专业委员会”委员，中国标准化创新战略联盟标准化专家，公安部“安全防护技术与风险评估”重点实验室特聘研究员。曾协助编制国家标准6项，承担或参与国家及省部级科研项目10余项，发表学术专著2部，SCI/EI论文10余篇。

Mary MIKOLAJEWSKI

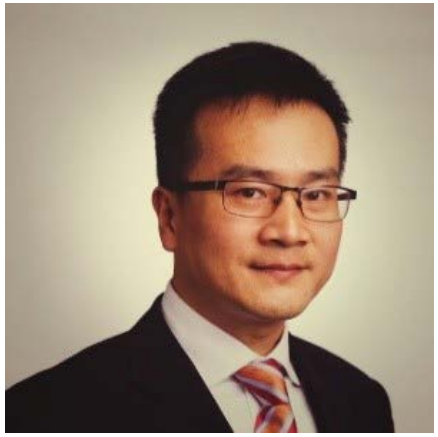
美国材料与试验学会
技术委员会运营经理

Manager, Technical Committee Operations, ASTM International

In 2010, Mary Mikolajewski joined the Technical Committee Operations division of ASTM International. In her role, she coordinates activities for multiple industries and directs the operations and strategic initiatives related to the standards work of four technical committees. She serves as staff support for the Committee on Technical Committee Operations, a standing committee of the ASTM Board of Directors, which oversees the maintenance of ASTM's Regulations and various aspects of committee operations.

Mary Mikolajewski 于2010年加入ASTM International的技术委员会运营部门。她负责协调多个行业的活动，并指导与四个技术委员会的标准工作有关的运营和战略计划。她为ASTM董事会常务委员会技术委员会运营委员会提供支持，负责监督ASTM法规的维护以及委员会各个方面的运营。

Henry YU (于庆黎)



Graduated from Nankai University, Henry has nearly 20 years of experience in the air purification industry. He has rich and practice experience in petroleum and petrochemical, gas turbine, automotive, microelectronics, municipal and commercial applications.

毕业于南开大学，Henry 在空气净化行业具有近20年的从业经验。在石油石化、化工、燃气轮机、汽车、微电子、市政和商业应用等行业皆有丰富的应用实践经验。

普拉飞
中国区总经理
亚太区销售副总裁

General Manager, China
Vice President, Sales in APAC region
Purafil

Lijuan TIAN (田丽娟)

Tian is an Application Engineer at Thermo Fisher Scientific. She has rich experience in the application and development of professional spectrometer products and technical training. She has expertise in portable spectroscopy technology and its application in the fields of security and food safety to achieve rapid on-site detection of dangerous chemicals substances. As a technical expert, she has repeatedly supported and participated in major event detection projects related to users such as public security, customs, environmental protection and food and drug administration.

具有丰富的专业光谱仪产品应用开发和技术培训经验，主要擅长在安防、食品安全等领域使用便携式光谱技术实现危化品等化学物质的现场快速检测。作为技术专家，多次支持和参与公安、海关、环保和食药监等用户相关的重大事件检测项目。

赛默飞世尔科技
应用工程师

Application Engineer
Thermo Fisher Scientific

Fang XU (许方)

美国国家标准化机构
中国代表处代表

Representative,
American National
Standards Institute,
China Office

Xu Fang has been working with American National Standards Institute (ANSI) as the Representative of ANSI China Office since 2012. In this position, he has primary responsibility for overall liaison of ANSI's activities with Chinese government agencies, standard development organizations and various industry groups.

Prior to working with ANSI, Mr. Xu served for American Forest & Paper (AF&PA) China Office as the main contact point for US government, industry and Chinese government for all of aspect of AF&PA China Program. As the representative of US forest industry, he worked with Chinese Ministry of Housing and Urban Rural Development (MoHURD) and State Administration of Forestry on developing and revising a serial of codes and standards pertaining to design, construction and inspection of wood constructions. He has made numerous presentations among Chinese developers, design professionals, importers and consumers and introduced applications of US wood products. Prior to joining in AF&PA, Mr. Xu worked with an engineering firm as the Chief Structural Engineer for more than 13 years. Mr. Xu holds his Bachelor of Engineering degree from Tongji University.

许方先生自2012年起担任美国国家标准化机构(ANSI)中国代表处的代表，负责ANSI在中国的相关工作和业务。在此之前，许先生于1999年起担任美国林业及纸业协会中国代表处首席代表，负责美国林产品的贸易政策以及市场推广。在此期间，许先生作为美国林产工业的代表，参与制订了中国数本关于木结构建筑设计、施工、验收以及产品的标准和法规的编写工作，为中国木结构建筑标准的应用和发展起了积极的作用。许先生毕业于同济大学结构工程专业，在加入美国林业及纸业协会之前，曾从事十多年的建筑工程设计与咨询业务，撰写过多篇学术论文。

KEYNOTE SPEAKER

Carl B. Kress
卡尔 • 克里斯

Regional Director, East Asia and the Middle East, North Africa, Europe and Eurasia,
U.S. Trade and Development Agency (USTDA)

美国贸易发展署
东亚、中东、北非、欧洲和欧亚大陆地区区域主管

KEYNOTE SPEAKER

Wanjin TANG
汤万金

Vice President
China National Institute of Standardization (CNIS)
中国标准化研究院 副院长

中国标准化研究院

中国应急管理标准化动态

1

应急管理改革

应急管理部成立背景

1、十八大以来，安全生产重特大事故时有发生，威胁着我国公共安全。

总体评价

- 肯定：事故起数减少了，死亡人数也减少了
- 否定：部分行业、部分地区重特大事故依然频发，不能满足人民群众对美好生活的追求需要
- 新层次：由企业、行业的层面上升到城市运行满足人民群众对美好生活需要层面

结论：安全生产形势依然严峻

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一 应急管理改革

二 应急管理标准体系

2

应急管理改革

应急管理部成立背景

2、国民经济与社会发展大形势

- 一是在90万亿元GDP（2018年）巨量以及持续增加情况下，不断压缩事故起数、死亡人数存在巨大困难；
- **二是**不断“**融合**”现有**各部门功能。**

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一 应急管理改革

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应急管理改革

应急管理部成立背景

3、国家机构改革的内在要求

这次是建国以来改革力度最大的一次改革，就是“一件事情归一个部门”管理、“一项功能归一个部门”管理。

综上所述，成立应急管理部既是党和政府**顺应**人民群众的“**呼声**”，**夯实**党的**执政基础**的需要，也是**破解**当前安全生产、应急管理**难题**的**抓手。**

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应急管理改革

国务院成立应急管理部

- 2018年3月21日，中共中央印发《深化党和国家机构改革方案》，成立中华人民共和国应急管理部。 4月16日，应急管理部正式挂牌。

- 涉及地震地质灾害、火灾、水旱灾害、生产事故等灾害的应急管理任务，是一个职责多、体量大的管理机构。
- 这次是建国以来改革力度最大的一次改革，是破解当前安全生产、应急管理难题的抓手。

应急管理改革

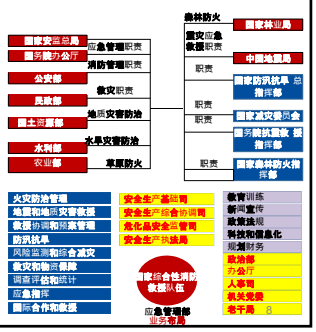
同其它部门的责任边界未全部理清

突发事件		主责部门
自然灾害类	地震	应急管理部
	洪水、干旱	
	地质灾害	
事故灾难类	生产安全事故灾难	应急管理部
	火灾	
	森林火灾	
	道路、铁路、航空安全事故	交通部、民航局
	大面积停电事件	能源局
	核事故	环保部
	环境突发事件	环保部
公共卫生类	传染病疫情	国家卫生健康委员会
	食品安全	国家市场监督管理总局
	重大动物疫情	农业农村部
社会安全类	群体性事件、恐怖袭击	公安部
	金融事件	中国人民银行

应急管理改革

国务院成立应急管理部

新组建的应急管理部先后整合了11个部门的13项职责，其中包括5个国家指挥协调机构的职责。



顺利完成了机构改革、人员转隶和公安消防、武警森林2支部队近20万人的转制。

应急管理改革

同其它部门的责任边界未全部理清

应急管理部与相关部门，如自然资源部、民政部等在日常监管、应急管理责任边界划分等未全部理清。

应急管理改革

地方应急管理机构陆之成立

- 继2018年9月30日，我国第一个省级应急管理厅—海南省应急管理厅挂牌之后，各地应急管理厅（局）相继挂牌。
- 截止到2018年11月30日，全国各省、自治区、直辖市应急管理厅（局）全部挂牌成立。

应急管理改革

应急管理改革后面临的新形势、新问题、新机遇、新挑战

1. 应急管理对象全面性的问题。“公共卫生事件”和“社会安全事件”，具体划归何部门，如何协同应对，是应急管理改革的一个问题。

2. 在习总书记提出要“走向深蓝”、建设“一带一路”之“21世纪海上丝绸之路”战略的大背景下，海上应急救援相关的改革并未见到大的动作。

应急管理改革

应急管理改革后面临的新形势、新问题、新机遇、新挑战

3 成立应急管理部的目的就是要把分散在各个部门的职责进行整合，但是应急管理部消防救援局和应急管理部森林消防局等仍然是独立存在的，是否继续整合？

4 一方面，安全生产仍然“保留”在应急管理部，具有一定的不合理性；另一方面，遏制重特大事故是一项长期任务，如何“理解”安全生产工作是应急管理部工作的“基本盘”？

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二 应急管理标准体系

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应急管理改革

安全生产与防灾减灾应急管理

这两类职责目标都是为了提高人民群众安全感，理念上都强调以人为本、安全第一、 生命至上、安全发展，在方法上都强调预防为主、风险治理，都是建设平安中国的重要部分。但二者存在一些不同：

- 安全生产责任主体是企业；应急管理要求党政机关承担主体责任
- 安全生产强调一切事故皆可预防；应急管理工作前提是事件肯定发生
- 安全生产强调政府行政执法；应急管理强调政府引导社会准备
- 《安全生产法》VS《突发事件应对法》

1 责任主体　2 基本前提　3 职责定位　4 主体法律

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应急管理标准体系构建

应急管理部的组成及职责

应急管理部作为国务院组成部门，协助我国进行应急管理工作，按照分级负责的原则，应急管理部代表中央统一响应支援，发生特别重大灾害时，应急管理部作为指挥部，协助中央指定的负责同志组织应急处置工作，保证政令畅通、指挥有效。应急管理部三大职责包括应急管理、安全生产、防灾减灾救灾。

应急管理部职责范围内标委会

序号	委员会名称
1	地震（TC225）
2	安全生产（TC288）
3	消防（TC113）
4	减灾救灾（TC307）
5	个体防护装备（TC112）
6	煤炭（TC42）

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应急管理改革发展趋势

应急管理改革总体趋势

以行业为龙头管理各项工作	行业管理型	→	功能管理型	以应急功能为核心整合各行业职能
协调议事机构；信息、舆情	虚	→	实	实体机构、预案、队伍、装备等
风险辨、评估、管控	风险管理	↔ 应急管理	危机管理	调查、问责、改进
设立临时的应急指挥机构	非常态管理	→	常态管理	建立自上而下的应急管理指挥体系

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应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
地震（TC225） 中国地震局地球物理研究所	负责全国地震专用仪器仪表、地震监测技术和方法、地震信息处理和代码、地震技术术语、符号、代号和制图方法、地震安全性评价、地震应急技术要求等专业领域	中国地震局

中国地震局 • 职责

- 拟定防震减灾发展战略、法律法规和标准等；
- 组织编制防震减灾规划、应急预案及预案备案制度，制定地震区划图；管理地震安全性评价工作；
- 监督检查防震减灾工作；
- 指导省级以下地震工作机构的工作；
- 管理全国地震监测预报工作；
- 承担国务院抗震救灾指挥机构的办事机构职责；
- 指导地震科技体制改革；
- 指导防震减灾知识的宣传教育工作；缺失
- 管理、监督地震相关经费和资金的监督和使用。

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应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
安全生产（TC288） 中国安全生产科学研究院	矿山安全、粉尘防爆、涂装作业安全、化学品安全、烟花爆竹安全、工矿商贸安全（不包括已有安全生产主管部门的行业）以及有关综合性的安全生产等领域国家标准制修订工作，不包括相关领域产品的国家标准制修订工作。	• SC1煤矿安全对应国家煤矿安全监察局 • SC2非煤矿山、SC8冶金有色安全、SC9工贸安全对应安全生产基础司； • SC3化学品、SC4烟花爆竹、SC5粉尘防爆、SC6涂装、SC7防尘防毒危险对应化学品安全监督管理司。

对应**司局** • 职责

- 国家煤矿安全监察局，拟订政策，参与起草法律法规，拟订规章、规程、安全标准，提出生产规划。
- 安全生产基础司，负责非煤矿山、石油、工矿商贸行业安全生产基础工作，拟订规程、标准，指导监督标准化、安全预防控制体系建设等。
- 化学品安全监督管理司，负责化工、医药、危险化学品和烟花爆竹安全生产监督管理工作，监督检查生产经营单位彻落实法律法规和标准情况，承担安全监督管理综合工作，组织指导目录编制和登记。

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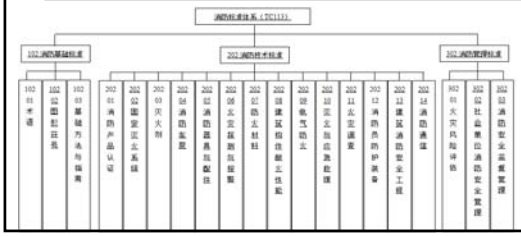
应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
消防（TC113） 公安部消防局	负责全国消防等专业领域标准化工作	火灾防治管理司 消防救援局



- 202.10 灭火与应急救援与“森林消防（TC523）”有交叉重叠问题；
- 202.12 消防员防护装备与“个体防护装备（TC112）、“森林消防（TC523）”有交叉重叠问题。

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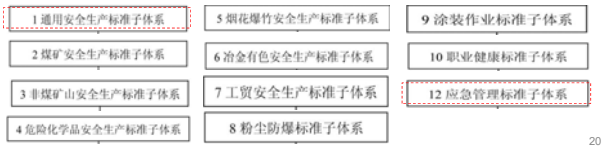
应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
安全生产（TC288） 中国安全生产科学研究院	矿山安全、粉尘防爆、涂装作业安全、化学品安全、烟花爆竹安全、工矿商贸安全（不包括已有安全生产主管部门的行业）以及有关综合性的安全生产等领域国家标准制修订工作，不包括相关领域产品的国家标准制修订工作。	• SC1煤矿安全对应国家煤矿安全监察局； • SC2非煤矿山、SC8冶金有色安全、SC9工贸安全对应安全生产基础司； • SC3化学品、SC4烟花爆竹、SC5粉尘防爆、SC6涂装、SC7防尘防毒危险对应化学品安全监督管理司。



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应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
减灾救灾（TC307） 民政部国家减灾中心	减灾救灾、灾害救助等领域，不涉及各专业部门已开展的工作领域	风险监测和综合减灾司 科技和信息化司 救灾和物资保障司

对应**司局** • 职责

风险监测和综合减灾司。建立重大安全生产风险监测预警和评估论证机制，承担自然灾害综合监测预警工作，组织开展自然灾害综合风险与减灾能力调查评估。

科技和信息化司。承担应急管理、安全生产的科技和信息化建设工作，规划信息传输渠道，健全自然灾害信息资源获取和共享机制，拟订有关科技规划、计划并组织实施。

救灾和物资保障司。承担灾情核查、损失评估、救灾捐赠等灾害救助工作，拟订应急物资储备规划和需求计划，组织建立应急物资共用共享和协调机制，组织协调重要应急物资的储备、调拨和紧急配送，承担中央救灾款物的管理、分配和监督使用工作，会同有关方面组织协调紧急转移安置受灾群众、因灾毁损房屋恢复重建补助和受灾群众生活救助。

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应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
消防（TC113） 公安部消防局	负责全国消防等专业领域标准化工作	火灾防治管理司 消防救援局

火灾防治管理司 • 职责

- 火灾防治管理司职能为组织拟订消防法规和技术标准并监督实施，指导城镇、农村、森林、草原消防工作规划编制并推进落实，指导消防监督、火灾预防、火灾扑救工作，拟订国家综合性应急救援队伍管理保障办法并组织实施。
- 消防救援局职能待定。

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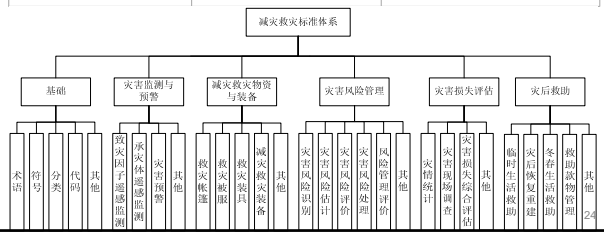
应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
减灾救灾（TC307） 民政部国家减灾中心	减灾救灾、灾害救助等领域，不涉及各专业部门已开展的工作领域	风险监测和综合减灾司 科技和信息化司 救灾和物资保障司



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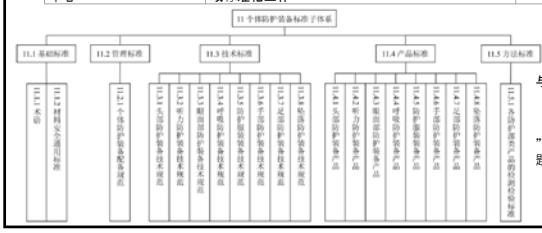
应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
个体防护装备（TC112） 应急管理部国际交流合作中心	负责全国开展生产过程中劳动者使用的个体防护装备，人群集体防护装备以及装备附带装置等专业领域标准化工作	政策法规司



与“消防（TC113）”、“森林消防（TC523）”有交叉重叠问题

应急管理标准体系构建

《应急管理标准化工作框架方案》

应急管理部在《应急管理标准化工作框架方案》中指出：在摸清底数、搞清现状的基础上，优化整合有关专业标委会，明确各专业标委会及其分标委的归口管理司局。

优化

优化消防（TC113），将森林和草原火灾应急救援标准纳入该标委会管理，并加强优化相应的分标委；

保持

地震（TC225）
安全生产（TC288）
个体防护装备（TC112）
煤炭（TC42）
基本维持原框架结构；加强与其他专业标委会信息共享、协调配合。

更名

将“全国救灾减灾标准化技术委员会（TC307）”更名为“全国应急管理与减灾救灾标准化技术委员会”，将水旱灾害、地震和地质灾害应急救援标准、应急装备标准和信息化标准、减灾救灾标准以及其他应急管理综合性标准纳入该标委会管理，并加强优化整合相应的分标委。

应急管理标准体系现状

各相关标准化技术委员会现状

委员会及原秘书处	技术委员会职责领域	相关司局
森林消防(TC523) 南京森林警察学院	森林火灾预防与扑救相关的专业基础及方法、防火工程建设、森林防火（消防）产品和装备、林火管理等	火灾防治司 消防救援局

- 与“消防（TC113）”在救援方面有交叉重叠问题；
- 与“个体防护装备（TC112）”在装备方面有交叉重叠问题。

应急管理标准体系构建

应急管理标准体系框架

应急管理标准体系现状

标准化现状总结

缺乏整体性

应急管理部的职责之前分散在各个部门，相应的标准制定也缺乏统筹，有些标准的覆盖领域重复，有些领域又缺少相应的标准。

缺乏战略性

从各技术委员会负责的专业范围看，大多是基础性和突发事件专业领域的内容，均没有涉及突发事件应急管理协调性、综合性等战略层面的标准，不能契合应急管理部的职能和定位。

缺乏协调性

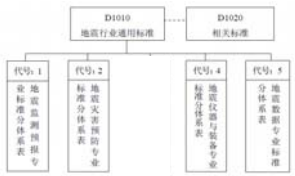
应急管理标准呈现出条块分割、资源碎片化、协调力度不够、缺乏联动性等协调性问题。

应急管理标准体系构建

地震

《应急管理标准化工作框架方案》要求

全国地震标委会（TC225）保持不变，加强与其他专业标委会信息共享、协调配合。(负责地震标准，地震救援除外)



应急管理标准体系构建

安全生产

编号	委员会及原秘书处	技术委员会职责领域	对应司局
102	安全生产（TC288） 中国安全生产科学研究院	矿山安全、涂装作业安全、化学品安全、烟花爆竹安全、工矿商贸安全（不包括已有安全生产主管部门的行业）以及有关综合性的安全生产等领域国家标准制修订工作，不包括相关领域产品的国家标准制修订工作。	• SC1煤矿安全对应国家煤矿安全监察局； • SC2非煤矿山、SC6涂装、SC8冶金有色安全、SC9工贸安全对应安全生产基础司； • SC3化学品、SC4烟花爆竹对应化学品安全监督管理司。

1 通用安全生产标准子体系
2 煤矿安全生产标准子体系
3 非煤矿山安全生产标准子体系
4 危险化学品安全生产标准子体系
5 烟花爆竹安全生产标准子体系
6 冶金有色安全生产标准子体系
7 工贸安全生产标准子体系
8 粉尘防爆标准子体系
9 涂装作业标准子体系
10 职业健康标准子体系
12 应急管理标准子体系

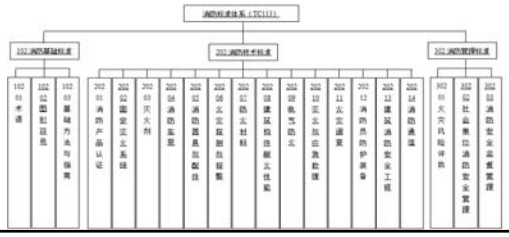
应急管理标准体系构建

应急管理与减灾救灾

应急管理标准体系构建

消防

编号	委员会及原秘书处	技术委员会职责领域	对应司局
104	消防（TC113） 公安部消防局	负责全国消防等专业领域标准化工作	火灾防治管理司 消防救援局



谢　谢!

应急管理标准体系构建

应急管理与减灾救灾

编号	委员会	对应司局	《应急管理标准化工作框架方案》中要求
103	应急管理与减灾救灾	防汛抗旱司 地震和地质救援司 救灾和物资保障司 风险监测和综合救灾司 科技和信息化司 其他司局	将“全国救灾减灾标准化技术委员会（TC307）”更名为“全国应急管理与减灾救灾标准化技术委员会”，将水旱灾害应急救援标准、地震和地质灾害应急救援标准、应急装备标准和信息化标准、减灾救灾标准以及其他应急管理综合性标准纳入该标委会管理，并加强优化整合相应的分标委。

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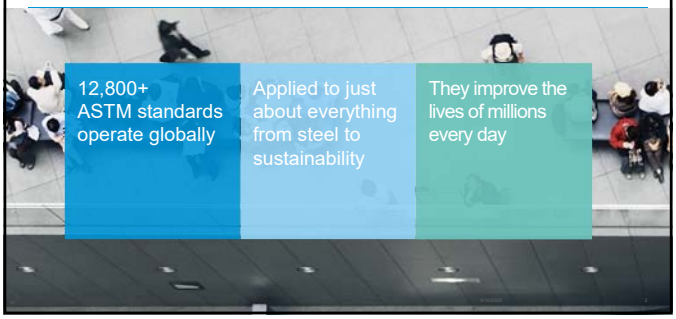
ASTM International
Emergency Management Services Standards

U.S.–China Emergency Management Industry and Standards Webinar

Mary Mikolajewski, Manager
Technical Committees E54 and F38
ASTM International
28 July 2020

www.astm.org

Helping Our World Work Better



Universal Equality of Opportunity

Operating Globally

- ASTM is one of the world's largest Standards Developing Organizations, with global reach and influence
- Working across political, cultural and geographic borders
- Trusted for market relevance and technical quality
- The choice for many global industries
  - within and outside the US
- ASTM has an office in Beijing
  - A MOU with SAC,
  - And Cooperative Agreements with CNIS and SIS

ASTM Technical Committees

Collaborative

- Consensus participation in a transparent process; open to anyone, anywhere
- Stakeholders are businesses of all sizes, producers, governments, labs, universities, and consumers; we build on the members' expertise
- Technical Committees: develop and manage standards, engage and liaise with other stakeholders, support development of strategy

Wide range of topics and uses

- Serving over 90 industry sectors from traditional to cutting edge
- Technical experts (marketplace) decide what standards are needed + content
- Standards are voluntary and global:
  - 8,400+ citations by more than 75 nations worldwide
  - The choice of many global industries; 50+% sales outside US

Dynamic Information

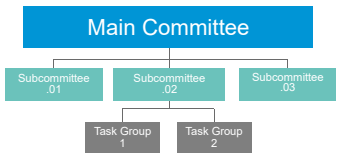
- Responding to new challenges, new technology, new markets
- New standards in 16-18 months, revisions in 6-8 months.
- Mandatory review every 5 years
- On-line membership tools (networking, web conferencing, balloting and drafting) and information access.

30,000 volunteer members from **158** nations participating in ASTM

148 main committees
2,000+ subcommittees

In 2019:
159 New
1934 Revised
12,800+ standards

Technical Committee Structure



Technical Committees
Address specific industry subjects

Subcommittees
Address subsets of specialized subject matter

Task Groups
Organized by subcommittees: standards get drafted, revised, and developed at this level

Importance of Standards

Roles of Standards

- Fundamental building blocks for product development
  - Establishes consistent protocols– universally understood and adopted (or not)
- Ensures safety, quality, and reliability
  - Consumer confidence (or not)
- Helps international trade
  - Market access (or not)

WTO TBT- International Standards

- Identifies six principles by which international standards are developed
- International standards have special status under WTO rules
- Regulations based on international standards are presumed not to create unnecessary obstacles to international trade
- International standards developed according to the WTO TBT Agreement promote trade and public-private cooperation

ASTM International Standards

ASTM International standards development brings together the public and private sector to solve technical problems. Our international standards:

Support Government Regulations

- Today, there are more than 8,400 citations of ASTM International standards as references in regulations, normative standards, adoptions, and as the basis of national standards in over 120 countries – including several Asian economies
- These standards address a range of products: raw materials, toys, infrastructure/construction products, medical devices, environmental aspects of air, soil and water, robotics, the application of additive manufacturing technology, and UAS.

Advance Public Policy Objectives

- ASTM embraces international principles to develop standards that enable trade, underpin good business regulation, promote private-public collaboration, and improve the integrity of products and materials on a worldwide basis

ASTM Has Several Related EMS TCs

Conventional EMS

ASTM Technical Committee F30 on Emergency Medical Services
- 35+ years developing standards
- Over 50 standards
  - EMS Equipment
  - Personnel, Training, Education
  - Communications
  - Organization/Management

ASTM Technical Committee F32 on Search and Rescue
- 30+ years developing standards
- Over 60 standards
  - Equipment, Testing, Maintenance
  - Management and Operations
  - Personnel, Training, Education

ASTM also has new technical committees addressing new aspects of EMS.

F38 Unmanned Aircraft Systems

Quick facts:
- Formed: 2003, memorandum agreement with FAA
- Current Membership: 480+ members (30 regulators), 25 nations
- Standards: 25 approved; 20+ in development

Subcommittees:

F38.01 Airworthiness
- Hardware oriented
- Safe design, construction, test, modification, & inspection of the individual component, aircraft, or system

F38.02 Flight Operations
- Procedure oriented
- Safe employment of the system within the aviation environment among other aircraft & systems

F38.03 Personnel
- Individual, Crew and Organization Oriented
- Safe practices by the individuals and teams responsible for employing the system

Global Representation

Australia	Ireland	Russian Federation
Belgium	Israel	Saudi Arabia
Brazil	Italy	Singapore
Bulgaria	Japan	Slovenia
Canada	Republic of Korea	Switzerland
China	Netherlands	United Arab Emirates
Denmark	New Zealand	United Kingdom
France	Norway	United States
Germany		

F38 Unmanned Aircraft Systems

Key Standards:
- F3442/F3442M-2020 Specification for Detect and Avoid System Performance Requirements
- F3389-2020 Test Method for Assessing the Safety of Small Unmanned Aircraft Impacts
- F3411-19 UAS Remote ID and Tracking
- F3266-18 Standard Guide for Training for Remote Pilot in Command of Unmanned Aircraft Systems (UAS) Endorsement
- F3379-20 Guide for Training for Public Safety Remote Pilot of Unmanned Aircraft Systems (UAS) Endorsement. (Just Published)

Under Development
- WK62669 Detect and Avoid Test Methods
- WK63418 Specification for Service Provided under UAS Traffic Management (UTM)
- WK65042 Guide for Operations Over People

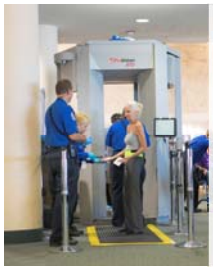
Areas Include:
Design & Construction
Design & Command
Design & Performance
Production Acceptance
QA
Batteries
Fixed Wing & VTOL
Safely Bound Flight Behavior
Software Dependability
Registration & Marking

E54 Homeland Security Applications

Quick facts:
- Formed: 2003
- Current Membership: 400+ from 12 nations
- Standards: 63 approved; 77 in development

Subcommittees:

E54.01 CBRNE Sensors and Detectors
E54.02 Emergency Preparedness, Training, and Procedures
E54.03 Decontamination
E54.04 Personal Protective Equipment (PPE)
E54.05 Building and Infrastructure Protection
E54.06 Electronic Security Systems
E54.07 Operational Equipment
E54.08 Response Robots

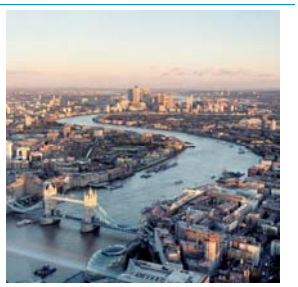


Key Stakeholders
Dept. of Commerce
Dept. of Homeland Security
Dept. of Justice
US Army
Chesapeake Testing
NFPA
NIOSH / NPPTL
NIST

E54 Homeland Security Applications

Key Standards:
- E2601-15 Standard Practice for Radiological Emergency Response
- E2842-14 Standard Guide for Credentialing for Access to an Incident or Event Site
- E2915-13 Standard Guide for Emergency Operations Center (EOC) Management
- E2951-13 Standard Guide for Community Emergency Preparedness for Persons with Disabilities

Under Development
- WK68829 Guide for Community Resilience Planning for Buildings and Infrastructure Systems
- E54.09 Suite of Standards on Response Robots and Aerials



E54.09 Response Robots

Aerial Response Robots – Test Methods Under Development

- Safety: Impact forces; lights & sounds; prop guards, sense & avoid; lost power behaviors; lost communication behaviors; lost GPS behaviors
- Situational Awareness: Point & Zoom Cameras; Inspect Planar Targets; Inspect Spiral Targets; Inspect Omnidirectional Targets; Search Wide Areas; Map Wide Areas; Navigate and Map Hallway Labyrinths
- Operation: Pre-flight Readiness Assessment & Launch & Recovery Procedures
- Sensing
  - Visual: Image Acuity; Dynamic Range, Color Acuity
  - Thermal: Image Acuity; Dynamic Range
  - Latency of Video, Audio and Control
  - Audio Speech Acuity
- Radio Communications: Line of Sight, Non-Line of Sight, Attenuated Range; Interference Range
- Energy / Power: Endurance Range (with & w/out payload); Dwell Time
- Maneuvering: Follow Lines While in Up & Down Range Orientation; Orbit a Point; Precision Landing; Negotiate through Wires, Pass through Windows and Slalom Obstacles
- Logistics: Configuration Identification; Packaging for Urban Search & Rescue Equipment
- Guides: Aerial Response Robot Purchasing; Response Robot Training; Response Robot test apparatuses

UAS Public Safety JWG: Overview

Overview

- Formed: 2017
- JWG Members
  - UAS Experts
  - Training Providers
  - Public Safety personnel

Experts Represented

- NFPA 2400
- F38 Unmanned Aircraft Systems
- F54 Homeland Security Applications
- F32 Search and Rescue

Objectives

- Identify key public safety UAS operations
- Prioritize operations for industry need
- Develop Consistent scenario structure for ease of personnel execution and acceptance
- Develop Standard Use-case scenarios

UAS Public Safety JWG: Overview

Areas of focus

- Accident Reconstruction Mapping
- Search and Rescue (SAR)
- Various environments and events
- Hazardous Chemicals / Hazmat
- Fire-fighting
- Structural Fire Response
- Wildfire Response
- Tactical Operations
- Payload Delivery
- Building Safety & Damage Assessment
- Closed Structure SAR

- Professional Qualifications
- Operational Requirements
- Safety Management Systems
- Operational Plan
- Record Keeping / Reporting
- Terminology

ASTM Contact Information

Committee Operations Questions
Mary Mikolajewski
Manager, Technical Committee Operations
Tel: +1.610.832.9678 | mmikolajewski@astm.org

China Office Questions
HU Yanan
Tel: +86.10.5109.6033 | nhu@astm.org

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Thank you

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Case Study 案例分享

危险化学气体泄漏应急处理最佳实践
Emergency Gas Scrubber

于庆黎 Henry Yu

普拉飞亚太区销售副总裁 & 中国区总经理

VP Sales APAC, Purafil & General Manager, Purafil China

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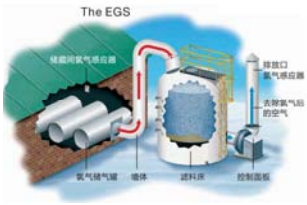
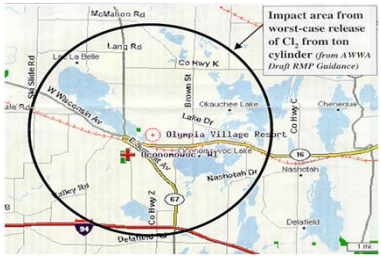
purafil Filtration Group®



氯气泄漏应急处理系统（EGS）案例

Chlorine - Emergency Gas Scrubber Case Study

Accidental Chlorine Release
一吨氯气罐的泄漏波及附近大约8公里范围(Ref. AWWA RMP)



Dangers of a Chlorine Release
氯气的毒性

- IDLH（立即威胁生命和健康）浓度是10ppm.
  - 臭味阀值 0.3ppm
  - 对眼睛刺激 1ppm
  - 立即咳嗽 20ppm
  - 可能致命 100ppm
  - 立即致命 1000ppm
- 在泄漏事故中，浓度可能会达到300,000ppm.

沧州一公司上周六氯气泄漏2死25伤 千余群众紧急疏散

Chlorine- Emergency Gas Scrubber Case Study
氯气泄漏应急系统案例

- 2000年10月，田纳西州的查塔努加污水处理厂（MBWWTP）开始了氯库改造项目。2001年4月安装了一个氯气应急气体处理器（EGS）
  - 当系统报警时可以启动，并能够吸附2000磅（900千克）的氯。
  - 氯气浓度传感器安装在滤库内，测量精度1 ppm，超过即激活警报，启动EGS装置使氯气不会从厂房泄漏。
- 风险管理计划：

  一级预案：以氯气泄漏的事故点半径2.6英里（4KM）以内，可能影响大约在马里昂和汉密尔顿县的33630名群众。

  二级预案：以氯气泄漏的事故点半径1.2英里（2KM）以内，可能影响大约在马里昂和汉密尔顿县的3230名群众。
- 2004年，专家在区域内模拟氯泄露环境并进行了针对性的应急演练。

Chlorine- Emergency Gas Scrubber Case Study
氯气泄漏应急系统案例（续）

- 在2009年10月， 当工厂工人试图关掉一个连接由空到满氯罐的管线时，发生了氯气泄漏。
  - o 该厂周围的街区，一个高尔夫球场和一个广播电台都紧急撤离。
  - o 紧急救援人员报告说工厂最多有1吨氯泄露。肇事工人仅带着轻伤脱险了。
- **工厂官员事后确认，**9年前安装的普拉飞EGS系统，在灾难发生后立即启动，并完全去除了一吨滤罐所泄漏的氯气。
  - o 确认氯气泄漏被有效处理后，该厂恢复了运行，疏散取消了，街区重新开放。事故在一小时内得到迅速处理。
- 事后的滤料取样分析表明在本次氯泄漏之后，EGS内的滤料仍有多于10%的余量。

普拉飞的EGS 系统，成功的完全处理了泄漏出来的氯气，和我们设计的一样。在一周内客户再次购买了滤料并完成了填充。

The Clean Air Act
美国环保署（EPA）-洁净空气法案

- 适用于任何有危险物质的场所
- 如果有毒物质的含量超过公布的限制，运营商必须与有关当局登记。
  - Cl_2 阀值是2,500 磅
  - SO_2阀值是5,000 磅
  - NH_3阀值是10,000 磅
- 运营商必须制定风险管理计划(RMPs)
  - 实施预防政策
  - 产品安全报告
  - 提供外部应急计划
- UFC消防条例规定：发生泄漏或事故时， 单位最大氯气储存罐中的全部氯化学品必须在30分钟内处理完毕

Purafil Dry Accidental Chlorine Release Mitigation Solution
干法过滤装置（普拉飞）– 满足UFC消防条例规定

- **装置包括：**
  滤料罐，鼓风机，氯气检测仪
- **滤料有高达15% 氯气吸收能力**
  - 滤料使用寿命监测
  - 滤料不会发生退化
  - 反应后的滤料可直接填埋
- **泄漏发生时，系统内滤料会从前到后逐渐反应，气/液扩散无阻碍**
- 设计满足最大泄漏的情况
  - 氯气初始瞬时量：400磅/分钟；剩下的以80磅/分钟速度挥发
  - 设计按照能够吸收最大单次存储或使用量来设计(如典型的1-吨系统)。
- **小于5ppb的排放，远远优于法规的要求**

普拉飞干法危险化学气体泄漏应急系统
Purafil Dry Emergency Gas Scrubbing System

Purafil Emergency Gas Scrubber History
普拉飞危险化学气体泄漏应急处理系统（EGS）历史

- 1991年，设计研发，可行性试验，并开始在市场上推广
- 1991年，安装第一台处理装置 （150磅）
- 1993年，在美国田纳西州第一台1吨的装置成功启动
- 1996年，美国底特律城使用了6套系统后，技术得到业界广泛的接受
- 2002年，第一个美国海外装置在澳大利亚墨尔本投入使用
- 2005年，成功启动第一台1吨的干式除氨处理系统
- 2009年，第一台3吨的装置在美国田纳西州投入使用
- 到目前为止，全球已有超过250个EGS系统在运行

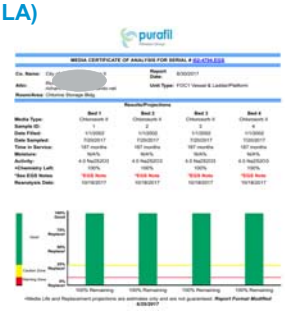
Purafil Dry-Scrubbing Media
普拉飞干法气相净化滤料产品

化学滤料产品	目标毒害气体
CSO	氯气，二氧化硫
Chlorosorb	氯气
Chlorosorb Ultra	氯气
Odorcarb Ultra	硫化氢
Puracarb	氯气，二氧化硫，硫化氢
Puracarb AM	氨，胺

- 滤料无毒无害，反应后的滤料可直接填埋
- 宽广的适用温度 （5ºC 到52ºC）
- 340ºC自燃测试

Media Life Testing
普拉飞滤料使用寿命分析（MLA）

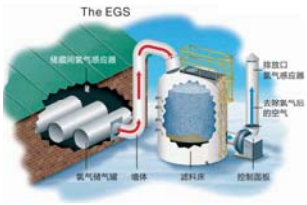
- 普拉飞滤料可以通过实验室的化学分析显示出剩余的活性成分
- 通过已使用的时间，可估算出剩余的滤料寿命
- 可以帮助客户预测滤料更换时间。



Emergency Gas Scrubber
普拉飞干法危险化学气体泄漏处理装置

玻璃钢

铝质



干法EGS系统 V.S. 湿法碱液处理系统
Wet Versus Dry Scrubbing

Wet Scrubbing
湿法碱液处理氯气系统

湿法碱液系统的维护

- **NaOH 是一种危险物料(强腐蚀性)**
  - o 操作时，需要佩戴面具，穿好防护服
  - o 废弃或降级的碱液需作为危废处理
- **NaOH 溶液循环系统包括泵，风机，液位计等**
  - o 泵，阀门，管件易出现泄漏
- **NaOH碱液化学性能会随着时间的推移而下降**
  - o $NaOH + CO_2 >> NaHCO_3$
    - 降低NaOH强度
    - $NaHCO_3$ 会存在于内表面上
    - $NaHCO_3$溶解度很低，必须以机械或化学方法除去
- **排出的氯气浓度在1-5ppm**

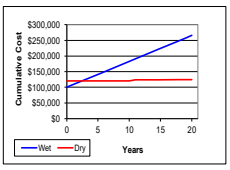
Wet Versus Dry Scrubbing
普拉飞干法 EGS 对比 湿法的优势

- **从设备的复杂性角度看**
  - 湿法过滤设备包含泵，风机，液位计等许多部件
  - 干法过滤设备中仅有风机一个运动部件
- **从维护的难易程度上看**
  - 湿法过滤设备需要危险物料这一关键因素来达到很高的效率
  - 干法几乎不需要任何维护，滤料也无毒无害
- **从处理系统的效率上看**
  - 在设计负荷下，湿法处理后排放的有毒气体浓度在1-5ppm
  - 在任何负荷下，普拉飞的干法过滤处理后排放的有毒气体浓度小于5ppb

Wet Versus Dry Scrubbing
普拉飞干法EGS系统 对比 湿法碱液处理系统（续）

	Purafil EGS	湿碱系统
测试系统类型	用深槽型滤器测试	满刻度1吨洗涤液过滤器
以氯气最大初始加载速率进行测试过滤器	800磅/分	19-99磅/分
最大氯气排放浓度	0±5ppb	2,200 ppb
测试限制	无	不能把释放的大量氯蒸汽直接加载到测试洗涤器上

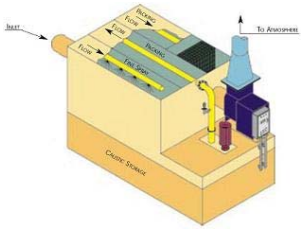
性能对比



经济效益对比

	初次投资	20年后
湿式	$100K	$265K
Purafil EGS	$120K	$127K

Transform Wet To Dry Scrubbing
普拉飞改造湿法处理系统 -错流式洗涤塔



- 需要17,250 lbs (7,824 kg) Chlorosorb Ultra 滤料 (15% 去除能力).
- 需要387 立方英尺，8.5 x 7 x 6.5 英尺
- 2个带有1英寸进出口区域的滤料填充床
- 可以利用现有的管道，罐体，风机等.

Purafil Emergency Gas Scrubber Application
普拉飞干法危险化学气体泄漏应急处理系统应用

液氯钢瓶使用企业

精细化工、炼油、石化、农药

液氯钢瓶使用企业

冷冻水站、制冷机站、食品库房、轨道交通

Purafil Emergency Gas Scrubber Summary
普拉飞干法危险化学气体泄漏应急系统 – 总结

- 除多种有毒有害气体氯气、硫化氢、氨气、二氧化硫等
- 设计抗负荷冲击极强
- 系统“零”维护
- 直观显示滤料的使用寿命
- 用过的滤料可以直接填埋
- 全球已有超过250个系统在运行

About Purafil
普拉飞公司介绍

Filtration Group®
Making the World Safer, Healthier & More Productive

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Filtration Group
美国过滤集团介绍

超过8000名员工
覆盖103个国家和地区
在28个国家设有相关机构
2018年营业收入超过16亿美金

制造基地　销售代表处/研发机构/仓库

Filtration Group
美国过滤集团介绍

生命科学
生物科学
生物制药
医疗排烟
家庭保健
日用消费品

流体
液力传动
手机
液压
压缩机

工业技术
过滤管 & 聚结器
分离 & 脱水
工业气体

室内空气质量
涂料 & 印染
暖通
气相过滤
洁净室
电子检测设备

Our Client
服务全球领导品牌

About Purafil 普拉飞公司介绍

概述

- 美国过滤集团旗下全球领先的气相滤料和过滤设备的供应商。
- 普拉飞成立于1969年，业务遍布全球72个国家
- 总部位于美国亚特兰大。

purafil Filtration Group

普拉飞致力于

- 普拉飞开发和制造专有滤料、产品和系统解决方案，保护生产过程、环境及人的健康。
- 普拉飞的解决方案针对工业、市政污水和商业场所的腐蚀性、毒性和刺激性气体。
- 普拉飞的专利产品可以有效过滤空气中颗粒物、有毒有害气体、臭味、细菌及病毒等污染物

相关解决方案

高级气相滤料 | 模块式过滤器 | 工程设备 | 实验和监测

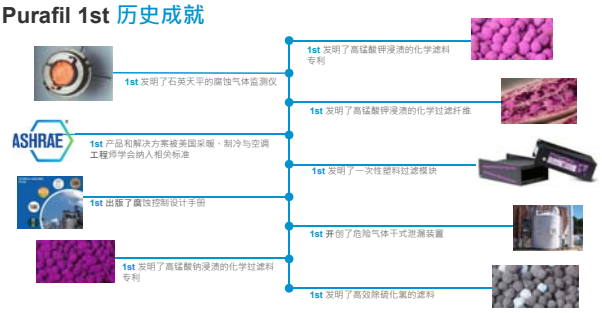
优势

- 50年空气过滤设计、工程和制造经验。
- 普拉飞历来的产品研发水平让我们持续开发出革命性的产品和高价解决方案。专利产品能去除230余种尺寸小至0.0001微米的空气污染物
- 做为美国相关委会成员引领行业发展，驱动行业产品标准化
- 全球业务覆盖72 个国家，9 个制造基地。

典型应用行业

工业 | 电子 | 污水 | 商业客户

Purafil 1st 历史成就



Developing Air Qualities Standards Across A Variety Of Markets

空气质量标准引领者

- **ASHRAE:** *美国采暖、制冷与空调工程师学会* SSPC 62.1; SPC 145P (Chair); TC 2.3; TC 9.8; TC 9.9, TC 9.11; TRG 4.11AQP
- **ASTM:** *美国材料与试验协会* – Technical Committees: D22.05; D28.04
- **IEST:** *美国环境科学与技术学会* – Working Groups: CC-008; CC-012; CC-035
- **ISA:** *国际自动化协会* – Technical Committee S71
- **ISO:** *国际标准化组织* – Technical Committees: ISO/TC 142; ISO/TC 205; ISO/TC 209; Memberships on U.S. Delegations/U.S. TAG
- **UL Classified:** *美国安全试验所* – Global Facilities Committee Standard P21-1102
- **LEED:** *美国绿色建筑协会* – LEED Version 4.0

协会, **合作机构** & 证书

Purafil Dry Gas Phase Media

普拉飞干式气相净化滤料的工作原理

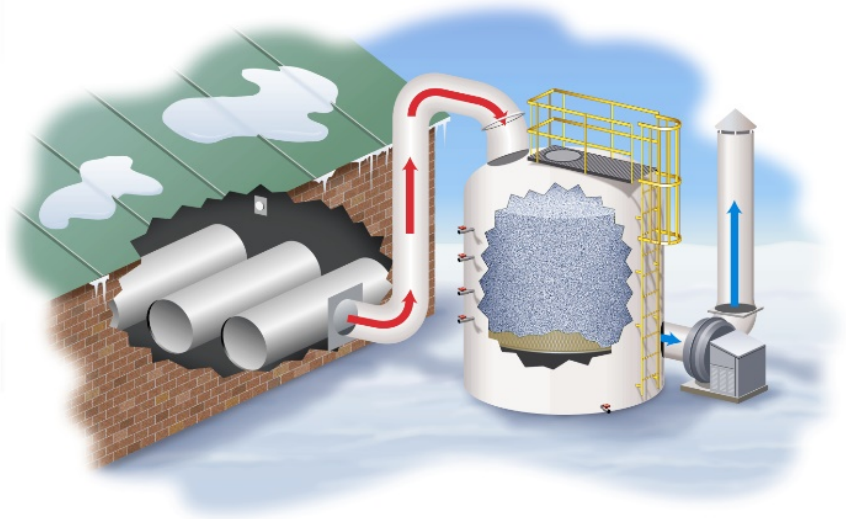
- **物理吸附** - 污染物进入滤料的孔隙内，吸附在滤料的表面
  - 吸附发生在滤料表面
  - 一般比表面积越大的滤料吸附越多的污染物
  - 可逆吸附过程， 有二次污染的可能
- **化学吸附** - 污染物与滤料发生化学反应
  - 特殊化学配方，不可逆过程
  - 气态污染物被转换为无害物质留着滤料内部，杜绝二次污染
- **普拉飞的滤料利用化学吸附来有效去除气体中的有害物质**
  - 高效大容量，使用寿命长
  - 杜绝二次污染
  - 滤料寿命可监控和可预测

Case Study Sharing
Best practices for Handling of Hazardous Chemical Gas Leakage

Henry Yu

General Manager, China
Vice President, Sales in APAC region
Purafil

July 28, 2020



Chlorine Leakage Emergency Treatment System (EGS)

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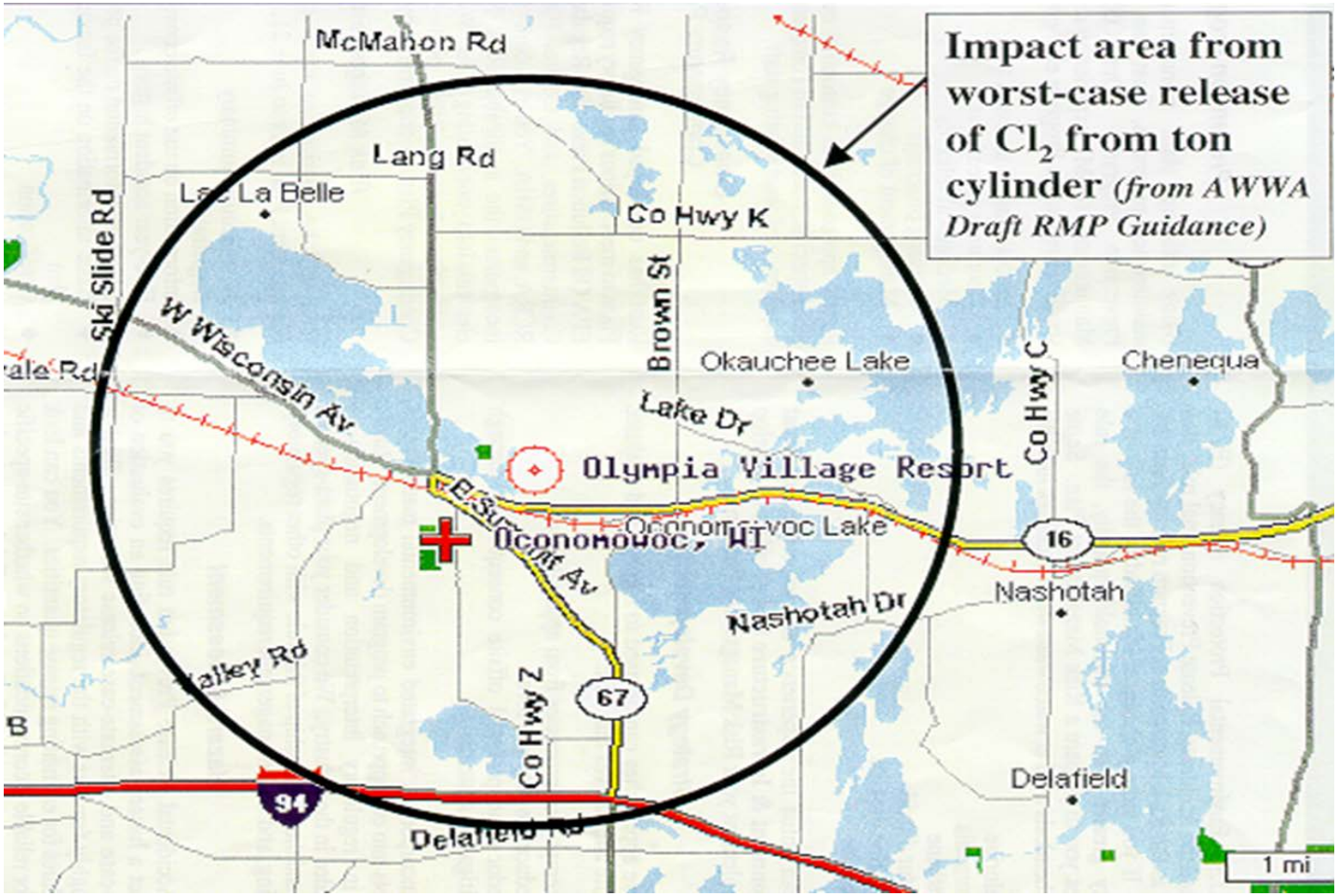
The leak of a ton of chlorine gas tank spreads to the area within 8 kilometers radius (Ref. AWWA RMP)



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Toxicity of chlorine

- The IDLH (immediately threatening life and public health) concentration is 10 ppm.
  - Odor threshold – 0.3ppm
  - Irritating to eyes – 1ppm
  - Cough – 20ppm
  - May be fatal – 100ppm
  - Immediately death – 1000ppm

  In a leakage accident, the concentration may reach 300,000 ppm.

沧州一公司上周六氯气泄漏2死25伤 千余群众紧急疏散

2017-5-18 20:43:11 来源:中国新闻网 选稿:成昭远

原标题：河北沧州一公司上周六氯气泄漏2死25伤，紧急疏散千余群众

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Case Study –Chlorine emergency responses

- In October 2000, the Moccasin Bend Wastewater Treatment Plant (MBWWTP) in Chattanooga (Tennessee) started the chlorine reservoir renovation project. A chlorine emergency gas processor (EGS) occurred in April 2001
  - When the system alarms, it can be activated and can absorb 2,000 pounds (900 kg) of chlorine.
  - The chlorine concentration sensor is installed in the filter house with a measurement accuracy of 1 ppm. If it exceeds, the alarm will be activated and the EGS device will be activated to prevent chlorine leakage from the plant.
- Risk management plan:
  - The first level plan: within 2.6 miles (4KM) of the accident site of the chlorine gas leak, it may affect 33,630 people in Marion and Hamilton counties.
  - The second level plan: within 1.2 miles (2KM) of the accident site of the chlorine leak, it may affect approximately 3,230 people in Marion and Hamilton counties.
- In 2004, experts simulated the chlorine leakage environment in the area and conducted targeted emergency drills.

Case Study –Chlorine emergency responses

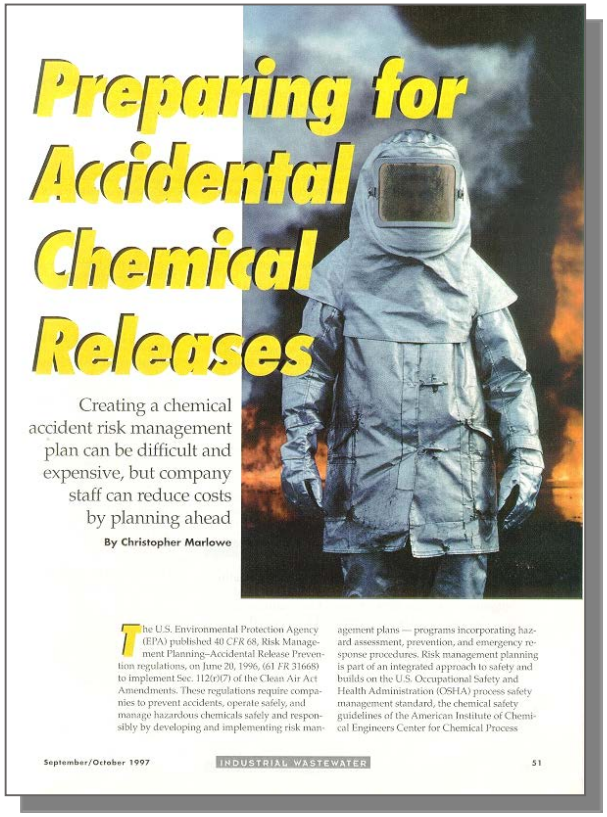
- In October 2009, when factory workers tried to shut off a pipeline connecting an empty to full chlorine tank, a chlorine leak occurred.
  - The blocks around the plant, a golf course and a radio station were evacuated in an emergency.
  - Emergency workers reported that up to one ton of chlorine leaked from the factory. The worker who caused the accident escaped with only minor injuries.

- Factory officials confirmed afterwards that the Purafil EGS system installed 9 years ago was activated immediately after the disaster and completely removed the chlorine gas leaking from the one ton canister.
  - After confirming that the chlorine leak was effectively treated, the plant resumed operation, the evacuation was cancelled, and the block was reopened. The accident was quickly dealt with within an hour. Subsequent sampling and analysis of the filter material showed that after this chlorine leak, the filter material in the EGS still had a margin of more than 10%.

Purafil's EGS system successfully completely dealt with the leaked chlorine gas, the same as our design. Within a week, the customer purchased the filter material again and completed the filling.

US Environmental Protection Agency (EPA) – Clean Air Act

- Suitable for any place with hazardous substances
- If the content of toxic substances exceeds the published limit, the operator must register with the relevant authority.
  - Cl2 threshold is 2,500 pounds
  - The SO2 threshold is 5,000 pounds
  - The NH3 threshold is 10,000 pounds
- Operators must develop risk management plans (RMPs).
  - Implement preventive policies
  - Product safety report
  - Provide external emergency plan
- The UFC fire protection regulations stipulate that in the event of a leak or accident, all chlorine chemicals in the unit's largest chlorine storage tank must be processed within 30 minutes.



Preparing for Accidental Chemical Releases

Creating a chemical accident risk management plan can be difficult and expensive, but company staff can reduce costs by planning ahead

By Christopher Marlowe

The U.S. Environmental Protection Agency (EPA) published 40 *CFR* 68, Risk Management Planning–Accidental Release Prevention regulations, on June 20, 1996, (61 *FR* 31668) to implement Sec. 112(r)(7) of the Clean Air Act Amendments. These regulations require companies to prevent accidents, operate safely, and manage hazardous chemicals safely and responsibly by developing and implementing risk management plans — programs incorporating hazard assessment, prevention, and emergency response procedures. Risk management planning is part of an integrated approach to safety and builds on the U.S. Occupational Safety and Health Administration (OSHA) process safety management standard, the chemical safety guidelines of the American Institute of Chemical Engineers Center for Chemical Process

September/October 1997 INDUSTRIAL WASTEWATER 51

Dry filter device to meets UFC fire regulations

- The device includes:
  - Filter tank, blower, chlorine gas detector
- The filter material has up to 15% chlorine absorption capacity
  - Filter life monitoring
  - The filter material will not degrade
  - The reacted filter material can be directly landfilled
- When leakage occurs, the filter material in the system will gradually react from front to back, and the gas/liquid diffusion will not be hindered
- Designed to meet the maximum leakage situation
  - The initial instantaneous amount of chlorine: 400 lbs/min; the rest evaporates at 80 lbs/min
  - The design is designed to be able to absorb the maximum single storage or usage (such as a typical 1-ton system)
- Less than 5ppb emissions, far better than the requirements of regulations

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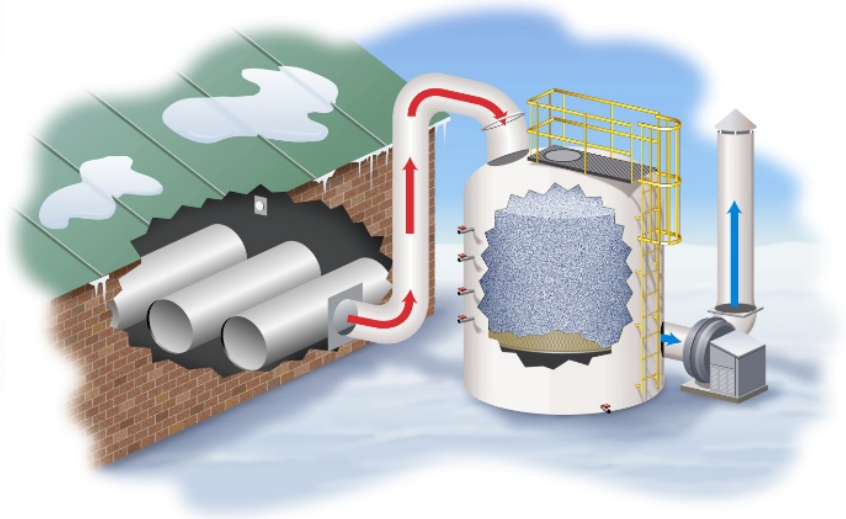

Emergency treatment system for dangerous chemical gas leakage

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The history of the Purafil hazardous chemical gas treatment system (EGS)

- In 1991, design research and development, feasibility test, and start to promote in the market
- In 1991, the first processing device (150 pounds) was installed
- In 1993, the first 1 ton plant was successfully launched in Tennessee, USA
- In 1996, when 6 systems were used in Detroit, the technology was widely accepted by the industry
- In 2002, the first American overseas installation was put into use in Melbourne, Australia
- In 2005, successfully launched the first 1 ton dry ammonia removal treatment system
- In 2009, the first 3-ton device was put into use in Tennessee, USA

So far, more than 250 systems are in operation worldwide

Purafil dry gas phase purification filter product

Chemical filter products	Targeted poisonous chemicals/gas
CSO	Chlorine, sulfur dioxide
Chlorosorb	Chlorine
Chlorosorb Ultra	Chlorine
Odorcarb Ultra	Hydrogen sulfide
Puracarb	Chlorine, sulfur dioxide, hydrogen sulfide
Puracarb AM	Ammonia, amine

- The filter material is non-toxic and harmless, and the reacted filter material can be directly landfilled
- Wide applicable temperature (5oC to 52oC)
- 340oC spontaneous combustion test

Purafil Media Life Analysis (MLA)

- Purafil filter media can show the remaining active ingredients through laboratory chemical analysis
- Through the used time, the remaining filter life can be estimated
- Can help customers predict the filter replacement time.

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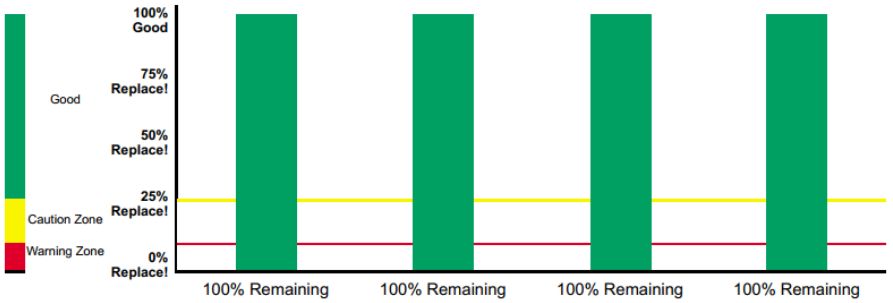
MEDIA CERTIFICATE OF ANALYSIS FOR SERIAL # I02-4704.EGS

Co. Name: City of [redacted] II
Attn: Ric[redacted] richard[redacted]ando.net
Room/Area: Chlorine Storage Bldg.
Report Date: 8/30/2017
Unit Type: FOC1 Vessel & Ladder/Platform

Results/Projections

	Bed 1	Bed 2	Bed 3	Bed 4
Media Type:	Chlorosorb II	Chlorosorb II	Chlorosorb II	Chlorosorb II
Sample ID:	1	2	3	4
Date Filled:	1/1/2002	1/1/2002	1/1/2002	1/1/2002
Date Sampled:	7/20/2017	7/20/2017	7/20/2017	7/20/2017
Time in Service:	187 months	187 months	187 months	187 months
Moisture:	N/A%	N/A%	N/A%	N/A%
Activity:	4.0 Na2S2O3	4.0 Na2S2O3	4.0 Na2S2O3	4.0 Na2S2O3
+Chemistry Left:	100%	100%	100%	100%
***See EGS Notes**	***EGS Note**	***EGS Note**	***EGS Note**	***EGS Note**
Reanalysis Date:	10/18/2017	10/18/2017	10/18/2017	10/18/2017



+Media Life and Replacement projections are estimates only and are not guaranteed. ***Report Format Modified 6/25/2017***

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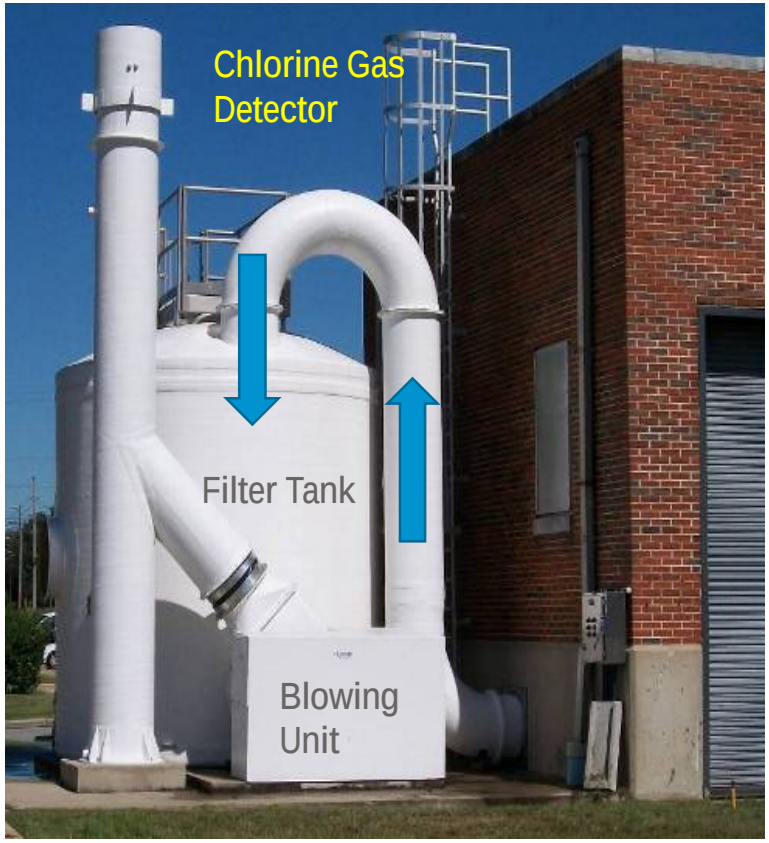
Hazardous chemical gas leakage treatment device



FRP

Aluminum

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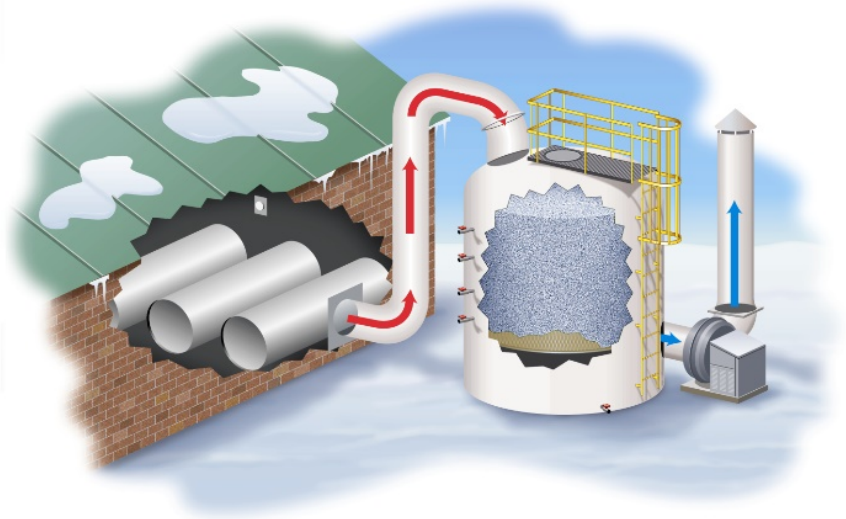

Dry EGS system v.s. Wet lye treatment system

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Wet lye treatment system

Maintenance of wet lye system

- NaOH is a dangerous material (strongly corrosive)
  - During operation, you need to wear a mask and protective clothing
  - Discarded or degraded lye should be treated as hazardous waste
- NaOH solution circulation system includes pumps, fans, level gauges, etc.
  - Pumps, valves, pipe fittings are prone to leakage
- The chemical properties of NaOH lye will decrease over time
  - RedNaOH + CO2 >> NaHCO3
  - uce NaOH strength
  - NaHCO3 will be present on the inner surface
  - NaHCO3 has very low solubility and must be removed mechanically or chemically

The concentration of discharged chlorine gas is 1-5ppm

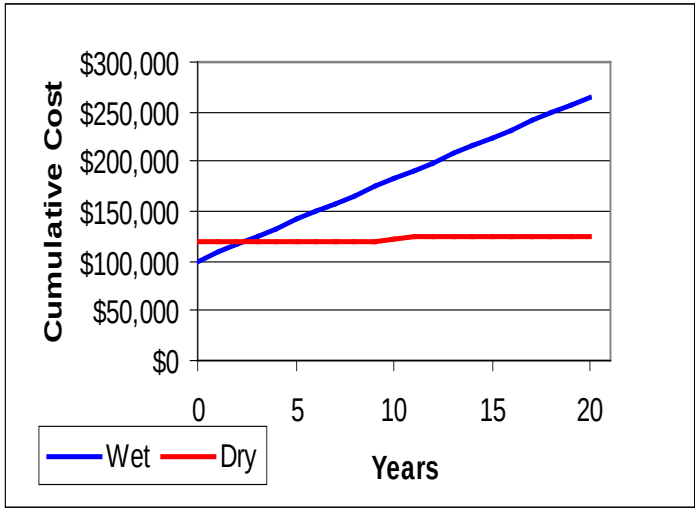
Dry EGS system vs. Wet lye treatment system

- From the perspective of equipment complexity
  - Wet filtration equipment includes pumps, fans, level gauges and many other components
  - There is only one moving part of the fan in the dry filter equipment
- From the perspective of ease of maintenance
  - Wet filtration equipment requires hazardous materials as a key factor to achieve high efficiency
  - The dry method hardly needs any maintenance, and the filter material is also non-toxic and harmless
- From the efficiency of the processing system
  - Under the design load, the toxic gas concentration after wet treatment is 1-5ppm
  - Under any load, the concentration of toxic gas emitted by Purafil's dry filtration treatment is less than 5ppb

Dry EGS system vs. Wet lye treatment system

	Purafil EGS	Wet lye treatment system
Test system type	Test with deep groove filter	Full scale 1 ton washing liquid filter
Test the filter at the maximum initial loading rate of chlorine	800 lb/min	19-99 lb/min
Maximum chlorine emission concentration	0±5ppb	2,200 ppb
Test limits	N/A	The large amount of released chlorine vapor cannot be directly loaded on the test scrubber

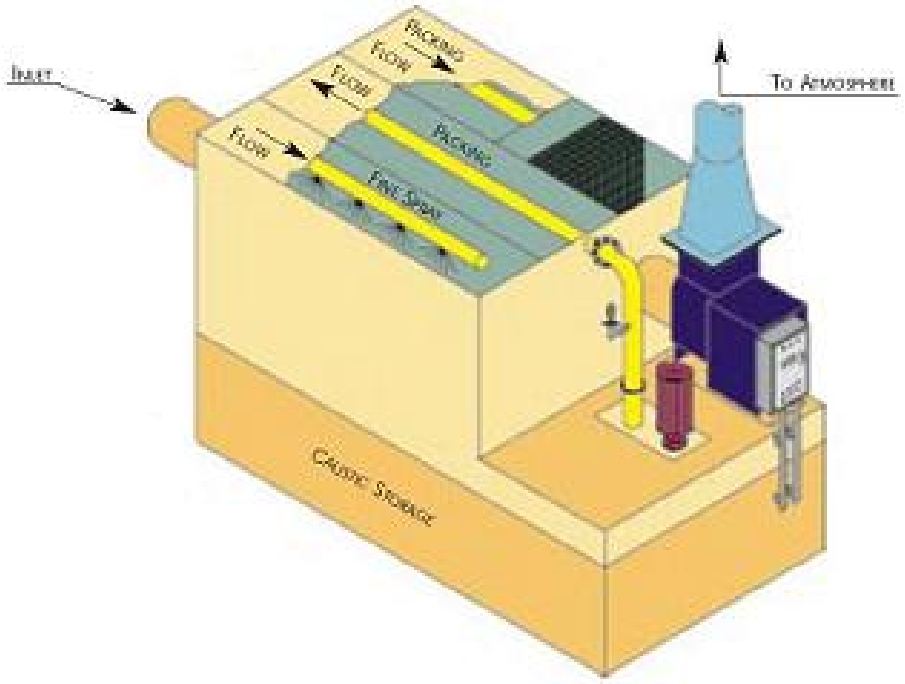
Performance comparison



Economic benefit comparison

	Initial investment	After 20 years
Wet Lye	$100K	$265K
Purafil EGS	$120K	$127K

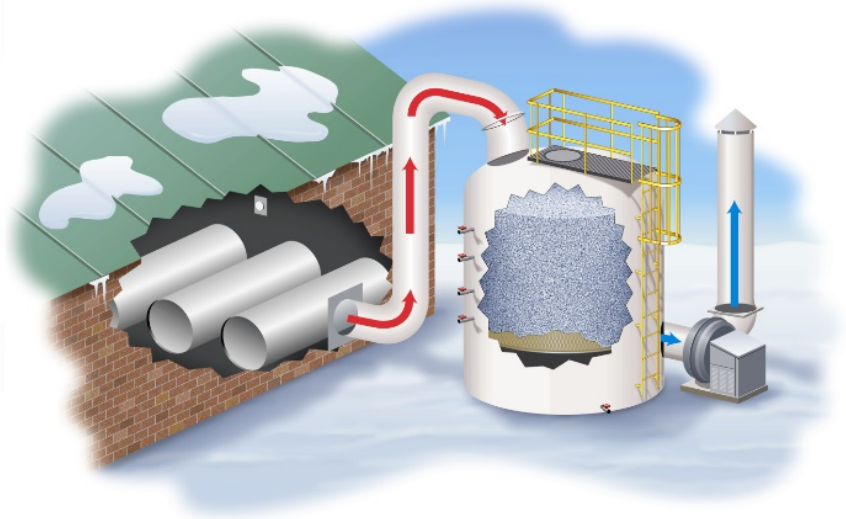
Purafil modified wet processing system - Cross flow scrubber



- Requires 17,250 lbs (7,824 kg) Chlorosorb Ultra media (15% removal capacity).
- 387 cubic feet required, 8.5 x 7 x 6.5 feet
- 2 packed beds of filter material with 1 inch inlet and outlet area
- Existing pipelines, tanks, fans, etc. can be used.

Purafil modified wet processing system – Conclusion

- In addition to a variety of toxic and harmful gases, chlorine, hydrogen sulfide, ammonia, sulfur dioxide, etc.
- Designed to be extremely resistant to load impact
- System maintenance
- Visually display the service life of the filter material
- The used filter material can be directly landfilled
- More than 250 systems are already in operation worldwide



About Purafil

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Purafil – the global leader in the gas filtration industry. Founded in 1969, with operations in 72 countries

- Chemical filter media and filter life analysis
- Dangerous chemical gas leakage treatment system
- Air purification equipment
- Environmental corrosion analysis and report
- Circuit board failure analysis
- Environmental monitoring instrument and test piece
- Comprehensive technical solutions

Purafil maintains ISO 9001 quality management system certification

Purafil's quality system manual clearly states:

- Technical indicators of filter media
- Test methods for quality inspection and control
- Test instrument calibration steps
- The format of the product quality inspection report

More than 30 ISO procedures cover the selection and preparation of raw materials, production processes, QA/QC testing and product packaging.

- Moisture content
- Chemical modifier content
- Bulk density

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We provide more than 20,000 tests and analyses every year, and the analysis report uses 12 languages to ensure that customers' air purification requirements meet the most stringent environmental protection standards








U.S. headquarters:

- Detect the type and quantity of toxic gases in the air
- For toxic and harmful gases in the air, evaluate the adsorption capacity and life of the filter material

China operations:

- In order to meet the continuous growth of the Chinese market and quickly respond to market demand, new laboratories and manufacturing facilities are added in China.

Product development cooperation:

- Actively seek technical cooperation with scientific research units and original equipment manufacturers

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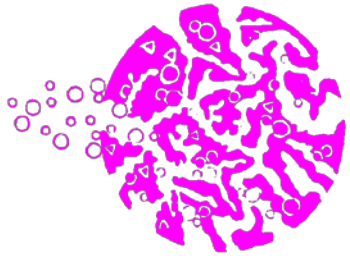
The principle of Purafil gas filtration

- Physical adsorption – pollutants entering the pores of the filter material and are adsorbed on the surface of the filter material
  - Adsorption occurs on the surface of the filter material
  - Generally, the filter material with the larger specific surface area adsorbs more pollutants
  - Reversible adsorption process, there is the possibility of secondary pollution
- Chemical adsorption-chemical reaction between pollutants and filter media
  - Special chemical formula, irreversible process
  - The gaseous pollutants are converted into harmless substances and kept inside the filter material to prevent secondary pollution



Purafil's filtration uses chemical adsorption to effectively remove harmful substances in the gas.

- High efficiency, large capacity, long service life
- Eliminate secondary pollution
- Filter life can be monitored and predictable

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ThermoFisher
SCIENTIFIC
应急管理和救援现场侦检技术解决方案
化学分析部 现场与安全
应用工程师 田丽娟
2020.07
The world leader in serving science


ThermoFisher
SCIENTIFIC
thermo scientific
applied biosystems
invitrogen
fisher scientific
unity lab services
>70,000 名
员工
5,000 名
研发团队科学家 / 工程师
10 亿美元
研发投资
>240 亿美元
收益
科学服务领域的世界领导者
2


我们携手客户，让世界更健康，更清洁，更安全
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applied biosystems
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invitrogen
加快探索速度
fisher scientific
一站式科学产品与解决方案供应商
unity lab services
仪器与企业服务
3


扎根中国，服务中国
上海
商务能力
2,600 余名面向客户的专业员工
600 多位现场服务工程师
13 个商业办公室
7 个应用开发中心
高效的电子商务平台
生产制造
7 家工厂
5 万多平米的工厂面积
研发创新
中国创新中心，面积 2000多平米
100 位专业研究人员和工程师
超过10个专利，每年6个以上新品
端对端产品开发能力
4


重大事故应急救援
WARNING
化工生产
火灾事故
港口储运
爆炸事故
交通运输
泄露事故
反恐防化
应急事故
辐射污染
核事故
化学工业产品越来越多，由于自然和人为因素，在生产、存储和运输等环节上，泄露、火灾、爆炸、中毒事故不断发生。
面对数万种类的危险化学品，现场消防指挥员不可能牢记每一种，每一类危险化学品的理化性质和处置措施，只有通过科学技术手段，快速，有效地开展侦检工作，才能准确地对危险品做出有效判定。
面对复杂的生化事故，只有专业的救援和高效的装备才能使救援快速有效。
放射性事故隐蔽性强，危害大，应急救援技术要求高，救援工作具有很强的专业性。
专业化、职业化、科学化
5


现 场 侦 检
一对有毒，有害，易燃，易爆物质进行及时分析
一测定污染物的种类，分布及周围环境受污染的范围界限
是进行应急救援工作的前提
是事故处置工作取得胜利的关键
选择合适的洗消剂和灭火剂
对参与救援的消防员做好针对性的个人防护
确定灾情处置方案，为后续救援行动提供强有力的支撑
利于把握抢险救援的主动权，最终控制并消除险情
6

事故现场侦检的**基本要求**：

- **准确**——检测方法可靠性高，对危险物质的分析判断准确
- **快速**——在现场极短的时间内提供分析结果
- **简便**——检测操作手段便捷
- **灵敏**——检测浓度低

全方位助力消防
提升现场应急检测能力

- 随时分析-开机即用
- 随地分析-坚固耐用，小巧便携
- 随人分析-操作简单，结果明确

技术原理

- **拉曼光谱（Raman）**是一种具有高灵敏度、高特征性的振动光谱**散射**分析技术。
- 傅里叶变换 **红外光谱(FT-IR)**是另一种基于振动光谱的**吸收**光谱分析技术。

- 红外和拉曼光谱仪通过快速采集化学品样本光谱，并与已知材料的**数据库进行匹配**，从而**识别和鉴定物质种类和成分**。

技术特点

拉曼光谱

- 擅长分析**液体**、半固体、白色或浅色**固体**
- **非接触式**扫描，可透过透明容器，避免与具有潜在危险性的未知物质进行直接接触
- **非破坏式**扫描，保护操作人员安全和保存物证

红外光谱

- 具有良好的普适性，对**固体**粉末、颗粒和**非含水液体**都能得到很好的分析结果
- 在识别各种**有色的物质**时极为有效，不受物质发荧光的影响
- 适用于**热敏感**性材料和**深色易燃、易爆**物质

Thermo Scientific ™

FirstDefender RM/RMX
手持式(拉曼)化学物质鉴定仪

Gemini
手持式(拉曼和红外二合一)分析仪

TruDefender FT/FTX
手持式(红外)化学物质鉴定仪

- 现场**快速、准确**地获知未知**化学品种类**
- 直观、清晰地了解化学品**危害程度**等级
- 快速获知**防护装备、消防信息**和**急救措施**等

优 势 特 点

- 内置庞大数据库和可靠算法，拉曼谱库12650种，红外谱库11500种，包括：
  - 危险化学品
  - 工业原料
  - 炸药
  - 化学战剂
  - 实验室试剂等

- 专为现场使用设计：
  - 重量轻，小巧便携
  - 防水防尘抗震，经过MIL-STD-810G和IP67测试
  - 无需样品制备，操作简单，结果简明

- 快速提供全面信息：
  - 1分钟获取化学物质名称，CAS号
  - NFPA 704危险品标识
  - **防护装备、消防信息**和**急救措施**指导信息

- **针对重大危险源的日常督查管理和紧急现场处置**

化工生产
- 对生产，存储的化学品进行清查确认，并进行安全的分类和安置

港口储运
- 对化学品火灾或爆炸现场物质检测，确定原因和事故范围

- **针对突发交通事故，恐怖袭击和危化品泄露的紧急现场处置**

应用案例

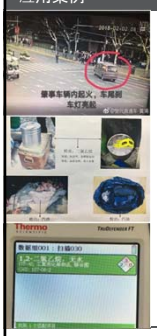
天津8•12

危化品仓库火灾爆炸事故

- 仓库存储多种危险化学品货物，现场化学物质发生连续爆炸燃烧和泄露扩散
- 事故现场发现大量爆炸后散落的白色固体物质，拉曼和红外侦检结果显示为不同的化学物质：
  硝酸钾，氰化钾，电石，三氯异氰脲酸，糖，咖啡因等
- 通过侦检结果，推断爆炸原因和影响范围，确定处置方案

13

应用案例



交通火灾事故

- 2018年2月2日，上海南京西路发生一起交通事故，肇事面包车着火
- 车内发现盛有不明液体的铁桶，通过现场使用手持式红外化学物质鉴定仪检测，结果显示为二氯乙烷，高度易燃，吸入有毒
- 此外在塑料瓶中检测出汽油，这些易燃物质成为车内着火的原因

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气体检测技术——红外气体摄像

Thermo Scientific ™ OPGAL EyeCGas
红外气体摄像仪

技术原理:
- 采用中红外3.2-3.4 μm之间波段，对石油和天然气等易燃气体组分很敏感
- 泄漏气体与环境背景温度不同
- EyeCGas摄像机的光谱带和泄漏气体发出的光谱一致

优势特点:
- **实时**视频摄像，直接定位泄露点
- 可**远距离**观测气体泄露情况
- **高灵敏度**, 低温热成像
- **多种**有机挥发性气体检测，VOCs (如甲烷，丁烷等)
- 获得**危险区**域使用**认证**

应用:
易燃气体泄露检查，发现泄露点，预防爆炸事故

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气体检测技术——红外气体摄像

Thermo Scientific ™ OPGAL EyeCGas
红外气体摄像仪

泄露检查

视频1-设备

视频2-管道

视频3-远程

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气体检测技术——有毒挥发气体分析

Thermo Scientific ™ TVA 2020C
有毒挥发气体分析仪

技术原理
- FID（火焰离子化）是一种高灵敏度通用型检测器，它几乎对所有的有机物都有快速响应，宽动态线性范围，重复性好
- PID（光离子化）是一种能够检测极低浓度挥发性有机化合物和其它有毒气体的检测器
- TVA 2020C是唯一将FID和PID检测器结合的主动泵吸式便携挥发气体分析仪

优势特点:
- 操作简便，体积小，适合工厂和野外场所
- 本安1级1区防爆
- 可快速连续分析和记录无机和有机挥发气体
- 内置数据记录功能，可选配蓝牙和GPS

应用:
应急监测、泄漏与修复监测、有毒废弃物现场评估、污染源调查等

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气体检测技术——有毒挥发气体分析

东海 “桑吉” 邮轮事件

- “桑吉”轮与散货轮相撞，随即起火燃烧并且持续剧烈燃爆
- “桑吉”装载了10多万吨凝析油（极其易燃易爆，燃烧产生有毒的烟雾）

- 使用TVA 2020C对事故现场毒烟毒气进行检查，发现中含硫量非常高，并为现场搜救人员提供污染范围信息

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粉尘监测

Thermo Scientific ™ PDM 3700
个人粉尘监测仪

测量即时、高质量的颗粒物浓度、累计浓度和限值百分比数据

技术：采用震荡天平法，精度优异

特点：
- 佩戴符合人体工学，重量轻
- 满足煤矿安全健康部防爆认证，适用于各种危险场所

应用：个人可吸入粉尘实时监测、职业环境颗粒物污染情况监测等

Thermo Scientific ™ pDR-1500
便携式颗粒物检监测仪

实时准确测定颗粒物浓度 PM_1，$PM_{2.5}$，PM_4和PM_{10}等

技术：采用浊度测定法、实时体积流量控制技术和相对湿度补偿功能

特点：
- 体积小、重量轻、易于操作
- 对环境适用性强
- 有无线数据传输模块，实现监测数据实时传输

应用：室内或环境颗粒物监测、现场治理、质量验证等

辐射测量技术

Thermo Scientific ™ RadEye系列
便携式辐射测量仪

RadEye SPRD

RadEye B20

RadEye G-Ex

RadEye PRD

- RadEye是最为先进的通用型便携式辐射测量仪
- 采用专利天然本底扣除技术 (NBR)，具有极高的灵敏度
- 该设备在国际原子能机构(IAEA) 开展的孤儿源搜寻与安保活动中被选定为唯一推荐设备
- 可用于辐射探测、Gamma剂量率测量和区域监测，其优异性能使其可用于放射源的搜寻和定位
- 不同型号，适应不同场景条件下对α，β，γ，中子辐射的实时探测和核素识别

可应用在核应急、边防、海关、反恐、安全保卫等领域

辐射测量技术

Thermo Scientific ™ RIIDEye
便携式能谱分析仪

精确识别放射性核素，可将ANSI兼容的88种核素库扩展到125种

- Hysteresis专利技术在2秒内为核素识别提供97%的置信率
- 实时显示同位素计量率，QCC专利谱分析技术可在1秒内识别混合同位素
- 具有核素识别、能谱分析、计量测量、计量率计算、总计量和数据报告等功能

Thermo Scientific ™ FH 40G 系列
NBR γ计量测量仪

快响应，高灵敏度
可用于甄别人工放射性

- 采用碘化钠和塑料闪体双探测器，专利的天然本地扣除技术（NBR），具有优良的能量响应和辐射响应能力
- FHT 672E-10探测器具有极高灵敏度，尤其适用于探测隐藏的辐射源，测量环境剂量当量率H* (10)
- 广泛应用于国土安全、环境监测和应急响应等领域

辐射检测技术——应用场景

■ **寻找丢失的放射源**
- 2007年6月，河北省某放射源丢失事件
- 2008年，四川汶川地震废墟中放射源搜寻
- 2013年6月，河北唐山某铸造公司Am-241放射性污染事件
- 2014年5月，南京工业探伤放射源Ir-192丢失事件

■ **核事故后的应急监测**
- 2011年3月日本福岛核电站泄漏事故

■ **核恐怖袭击应急预案**
- 应对“脏弹”袭击

水质检测技术

Thermo Scientific ™ AQ4700
便携式水质综合毒性分析仪

利用发光细菌进行生物毒性检测

特点:
- 操作简便、快速、灵敏
- 可检测多种样品的综合生物毒性，符合国际标准ISO11348的规定
- 仪器小巧轻便，配有便携箱，适合野外操作

应用:
- 环境污染、紧急事故等多领域的水体毒性分析，助于确定污染范围和洗消措施

Thermo Scientific ™ Orion Star A系列
便携式多参数水质测量仪

特点:
- 可同时测量pH/ISE(离子浓度)/电导率/溶解氧等参数
- 可保存5000组测量数据，符合GLP标准
- 便携式防水设计、防护等级IP67

应用:
- 现场及实验室水质分析

元素检测

Thermo Scientific ™ XL3/5
手持式XRF分析仪

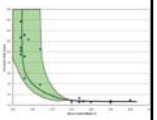
特点:
- 采用X射线荧光光谱技术，无损检测，速度快，操作简单，整个过程仅需几秒即可完成
- 密闭式设计，防水、防尘、防腐蚀，可以用于多种环境

应用:
- 石油化工行业，金属材料可靠性鉴别
- 适用于快速检测金属材料，土壤重金属污染等
- 快速，无损鉴定爆炸物中元素

爆炸物类型	主要成分	XRF快速鉴定的元素
黑火药	硝酸钾、硫磺、木炭	K, S
雷管	雷汞[Hg(ONC)2]、叠氮化铅$Pb(N_3)_2$	Hg、Pb
烟花	氯酸钾，高氯酸钾，硫磺，金属粉末(Al, Mg, Cu, Ti)	K、S、Al, Mg, Cu, Ti、Rb、Cs、Sr
高锰酸盐	高锰酸钾、硫磺、石墨	K、Mn、S
灼热剂	氧化铁、铝粉	Fe、Al

加利福尼加州雪佛龙里士满炼油厂 2012

- 2012年8月6日，**加利福尼**亚州里士满的雪佛龙炼油厂4号**原油装置**发生灾难性破裂。管道释放出易燃、高温的轻瓦斯油，部分汽化成一大片云层，吞没了19名**雪佛**龙员工。
- 碳氢化合物流体的释放、点火和燃烧导致覆盖周围区域的大量蒸汽和**微粒羽流**，导致社区警报系统3级警报和当地居民的紧急避难。
- **在事件**发生后的几周内，大约15000人**从周围**社区寻求治疗疾病，包括**呼吸**问题，胸痛，气短，喉咙痛和头痛。



事故调查：最终技术报告发现包括管道部件由**于**损坏机理**硫化腐**蚀而**极度**变薄。

美**国石油学会**API 939C规范阐明：炼油工业**中管道和**设备的硫化腐蚀是导致设备更换、计**划外停机以及与重大**财产损失和伤害相关的事故的重要原因。

硅含量小于0.10%的碳钢易受加速腐蚀速率的**影响，加速材料**变薄、壁厚退化和部件失效。

美国石油学会规范

- **美国石油学会**(API)
  - **Standard-API-570-Piping Inspection Code 管道**检测
  - **Standard-API-510-Pressure Vessel Inspection Code** 压力容器检测
  - **Standard-API-653-Storage Tank Inspection Code** 储油罐检测
  - **Recommended Practice-API RP-578-Material Verification Program-MVP/PMI 材料**验证计划
  - **Recommended Practice-API 571 – HF Corrosion in CS Pipes (REs, Cr+ Cu+ Ni =/< 0.15%) 管道中残余元素**氢氟酸腐蚀
  - **Recommended Practice-API 939-C-Guidelines for Avoiding Sulfidation (Low Si < 0.10%) 避免硫化腐**蚀
- **石油和天然气工**业的机械完整性需要
  - ✓ **ATC – API 578 PMI Certification Training Course 美国石油学会578指**导规范
  - ✓ **AIM- Asset Integrity Management**
  - ✓ **MI- Mechanical Integrity Requires, " Data Management" Software**

API 578 3rd Edition易引起事故的注意事项

Material	ASTM Specification		Maximum Design Temperature	
	Casting	Plate	°C	(OF)
Carbon steel	A216 GrWCB	A283GrC	425	(800)
21/4Cr-1Mo	A217 GrWC 9	A 387 Gr 22, Class 1	650	(1 200)
5Cr-1/2Mo	A217 GrC5	A 387 Gr 5, Class 1	650	(1 200)
19Cr-9Ni	A 297 Gr HF	A 240, Type 304H	815	(1 500)
25Cr-12Ni	-	A 240, Type 309H	870	(1600)
25Cr-12NI	A 447 Type II	-	980	(1 800)
25Cr-20NI	-	A 240, Type 310H	870	(1 600)
25Cr-20Ni	A351 Gr HK40	-	1090	(2000)
50Cr-50NI-Nb	A 560 Gr 50Cr-50Ni	-	980	(1 800)

For exposed radiant and shield-section tube supports, the material shall be 25Cr-12Ni or higher alloy.

PMI – 材料可靠性鉴定

- **在石油精**炼、化工、电力等行业，为避免管道和其他组件发生故障产生灾难性后果，需要进行无损分析，包括**用于**维护周转存储在库房的组件。
- **精准**鉴定并确保所安装的组件是正确的，这非常关键。确保设施安全，符合行业规范，才能减少故障和失败。

- **便携式XRF是石油石化行**业进行PMI的标准工具
- **主要用来**检测：
  - ✓现有管道系统
  - ✓**管道配件、**阀门、法兰
  - ✓焊缝焊点及焊接材料
  - ✓**来自供**应商的各类配件
  - ✓锻件
  - ✓**螺栓**
  - ✓各类设备等

Thermo Fisher 在全球50多个国家拥有7万名员工
为全球科学事业服务

Thank You !

ThermoFisher SCIENTIFIC

Fire Emergency and Detection Technology Solutions

Chemical analysis site and safety

July 2020

Emergency Rescue for Major Accidents

Chemical production Fire accident

Port storage and transportation Explosion accident

Transportation and logistics Leak accident

Chemical Resistance/ Emergency

Radiation pollution Nuclear accident

- Increasing demand for industrial products. Natural and human-caused incidents, leakage, fire explosion accidents continue to occur in production, storage, and transportation sectors.
- Various types of hazardous chemicals. It is impossible for firefighting commanders to analyze physical and chemical properties and disposal measures of each type of hazardous chemicals. Only through scientific and technological means.

- Facing complex biochemical accidents, only professional rescue and efficient equipment can make rescue fast and effective.
- Radioactive accidents are highly concealed and harmful, which require high-end emergency rescue technology.

Specialization. Professionalism. Scientific.

ThermoFisher SCIENTIFIC

Onsite Detection

——Timely analysis of toxic, harmful, flammable and explosive substances
——Determine the type and distribution of pollutants and the limits of the polluted surrounding environment

- Is the prerequisite for emergency rescue work
- Is the key to the success of accident handling

✓ Choose the right decontaminant and fire extinguishing agent
✓ Perform targeted personal protection for firefighters involved in rescue
✓ Determine the disaster response plan to provide strong support for follow-up rescue operations
✓ Conducive to grasp the initiative of emergency rescue, and ultimately control and eliminate the danger

The basic requirements of the accident scene inspection:

- Accuracy – hHgh reliability of the detection method, accurate analysis and judgment of hazardous substances
- Rapid – Fast-provided analysis results in a very short time onsite
- Convenience – Convenient means of detection and operation
- Sensitivity – Low detection concentration

Onsite Portable Detection Technology Solutions

Fully assist fire protection
to improve on-site emergency
detection capabilities

– Ready to use and analyze

– Analysis-robust, compact and portable

analysis – Easy to use; accurate results

ThermoFisher SCIENTIFIC

Technical Principles

Raman spectroscopy (Raman) is a vibrational spectral scattering analysis technique with high sensitivity and high characteristics. Fourier Transform Infrared Spectroscopy (FT-IR) is another absorption spectrum analysis technique based on vibrational spectroscopy. Infrared and Raman spectrometers quickly collect the spectrum of chemical samples and match them with a database of known materials to identify the type and composition of substances.

Technical Characteristics

Raman spectroscopy

- Good at analyzing liquid, semi-solid, white or light-colored solid
- Non-contact scanning, which can penetrate transparent containers to avoid direct contact with potentially dangerous unknown substances
- Non-destructive scanning to protect the safety of operators and save physical evidence

infrared spectra

It can get good analysis results for solid powder, granules and non-aqueous liquids It is extremely effective in identifying various colored substances and is not affected by the fluorescence of substances Suitable for heat sensitive materials and dark flammable and explosive materials

Detection Technology for Solid and Liquid

FirstDefender RM/RMX

Handheld (Raman) chemical substance identification equipment

Thermo Scientific ™ Gemini

Handheld (Raman and infrared combo) analyzer

- Quickly and accurately capture unknown chemical types on site
- Intuitively and clearly understand the level of chemical hazard
- Quick access to protective equipment, fire protection information and first aid measures, etc.

TruDefender FT/FTX

Handheld (infrared) chemical substance identification equipment

ThermoFisher SCIENTIFIC

Advantage and Characteristics

- Built-in huge database and reliable algorithm, 12,650 types of Raman spectrum
- 11,500 types of infrared spectrum database, including:
  - Hazardous Chemicals
  - Industrial raw materials
  - Explosive
  - Chemical warfare agent
  - Laboratory reagents, etc.
- Designed for on-site use:
  - Lightweight, compact and portable
  - Waterproof, dustproof and shockproof

  tested by MIL-STD-810G and IP67
  - No sample preparation, simple operation, concise results
- Provide comprehensive information quickly:
  - Get chemical substance name
  - NFPA 704
  - Protective equipment fire protection information

  and first aid measures guidance information

Solid and Liquid Detection Solution – Scenarios

- Daily supervision and management; emergency on-site disposal of major hazards

Chemical Production

- Check and confirm the production and storage of chemicals, and carry out safe classification and placement

Port and Transporting

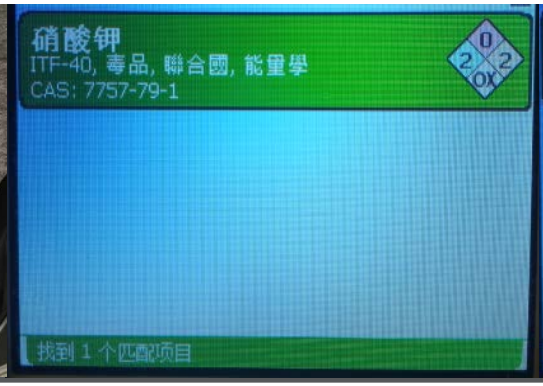
- Detection of substances at the chemical fire or explosion sites to determine the cause and scope of the accident

- Emergency on-site handling for sudden traffic accidents, attacks and leakage of hazardous chemicals

Other Scenarios and Case Study

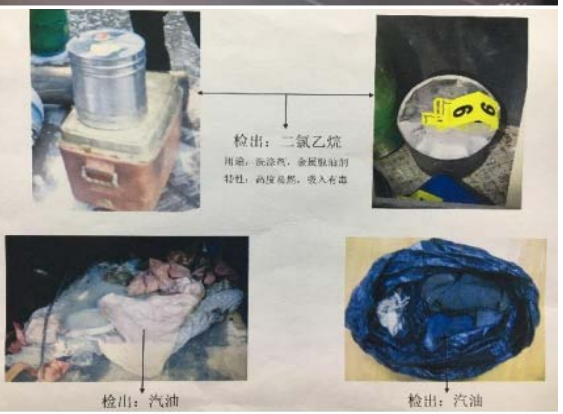
Tianjin 8·12
Fire and explosion accident in hazardous chemical warehouse

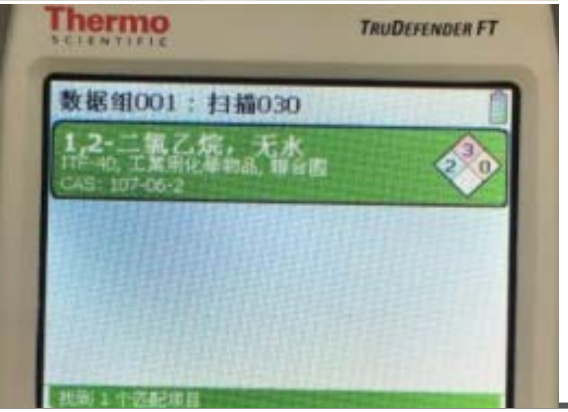
- The warehouse stores a variety of dangerous chemical goods, and the chemical substances on the scene exploded and continuously leaked and spreaded
- A large number of white solid substances scattered after the explosion were found at the scene of the accident, and the results of Raman and infrared detection showed that they were different chemical substances: Potassium nitrate, potassium cyanide, calcium carbide, trichloroisocyanuric acid, sugar, caffeine, etc.
- Infer the cause and scope of the explosion based on the results of the investigation and determine the disposal plan



ThermoFisher SCIENTIFIC

Other Scenario and Case Study





Traffic-related fire accident

- On February 2, 2018, a traffic accident occurred on Nanjing West Road, Shanghai, and the van caught fire.
- An iron drum containing an unknown liquid was found in the car. The result was detected by a handheld infrared chemical substance identification instrument on the spot. The result showed that it was dichloroethane, which is highly flammable and toxic by inhalation.
- In addition, gasoline was detected in plastic bottles. These flammable substances became the cause of fire in the car.

ThermoFisher SCIENTIFIC

Gas Detection Technology – Infrared Gas Camera

Thermo Scientific ™ OPGAL EyeCGas Infrared Gas Camera

Technical principle:

- Using mid-infrared band between 3.2-3.4 ㎛, it is very sensitive to flammable gas components such as oil and natural gas
- The leaked gas has a different background temperature from the environment
- The spectral band of the EyeCGas camera is consistent with the spectrum emitted by the leaking gas

Advantages:

- Real-time video camera to directly locate the leak
- Can observe gas leakage from a distance
- High sensitivity, low temperature thermal imaging
- Various organic volatile gas detection, VOCs (such as methane, butane, etc.)
- Obtained certification for use in hazardous areas

Application: Check for flammable gas leaks, discover leaks and prevent explosion accidents

Gas Detection Technology – Infrared Gas Camera

Thermo Scientific ™ OPGAL EyeCGas Infrared Gas Camera

Leakage detection

Equipment

Pipes

Remote

ThermoFisher SCIENTIFIC

Gas Detection Technology – Toxic Volatile Gas Analysis

Thermo Scientific ™ TVA 2020C

Toxic Volatile Gas Analysis

Technical Principle

- FID (flame ionization) is a high-sensitivity general-purpose detector, it has a fast response to almost all organic substances, wide dynamic linear range, and good repeatability
- PID (photoionization) is a detector that can detect very low concentrations of volatile organic compounds and other toxic gases
- TVA 2020C is the only active pumping portable volatile gas analyzer that combines FID and PID detectors

Advantages:

- Simple operation, small size, suitable for factories and field places
- Intrinsically safe class 1 zone 1 explosion-proof
- It can quickly and continuously analyze and record inorganic and organic volatile gases
- Built-in data logging function, optional Bluetooth and GPS

Application: Emergency monitoring, leakage and repair monitoring, toxic waste site assessment, pollution source investigation, etc.

Gas Detection Technology – Toxic Volatile Gas Analysis

East China Sea "Sanji" cruise inc

- Cruise ship "Sanji" collided with a bulk carrier caught fire and continued to explode violently
- "Sanji" is loaded with more than 100,000 tons condensate (extremely flammable and explos produces toxic smoke)

- **Approach:** Use TVA 2020C to inspect the toxic smoke and gas at the accident site, it was found that the sulfur content was very high, and the pollution range information was provided to the on-site search and rescue personnel

Thermo Scientific ™ PDM 3700

Personal Dust Monitor

Measure instant, high-quality particulate matter concentration, Cumulative concentration and limit percentage data

Technology: Using the oscillating balance method with excellent accuracy

Features:
Ergonomic wearing and light weight
Meet the explosion-proof certification of the Ministry of Coal Mine Safety and Health, suitable for various hazardous locations

Application: real-time personal inhalable dust monitoring, occupational environmental particulate pollution monitoring, etc.

Thermo Scientific ™ pDR-1500

Portable Particle Inspection Monitor

Real-time accurate determination of particle concentration of PM_1 , $PM_{2.5}$, PM_4, PM_{10}

Technology: Adopt turbidity measurement method, real-time volume flow control technology and relative humidity compensation function

Features:

- Small size, light weight, easy to operate
- Strong environmental suitability
- There is a wireless data transmission module to realize real-time transmission of monitoring data

Application: Indoor or environmental particle monitoring, on-site governance, quality verification, etc.

Thermo Scientific ™ RadEye系列
Portable Radiation Analyzer

RadEye SPRD

RadEye B20

RadEye G-Ex

RadEye PRD

- RadEye is the most advanced universal portable radiation meter
- Using patented natural background subtraction technology (NBR), with extremely high sensitivity
- The device was selected as the only recommended device in the orphan source search and security activities conducted by the International Atomic Energy Agency (IAEA)
- It can be used for radiation detection, Gamma dose rate measurement and area monitoring. Its excellent performance makes it useful for searching and positioning radioactive sources
- Different models, suitable for real-time detection and nuclide identification of α, β, γ, neutron radiation in different scenarios

Can be used in nuclear emergency, border defense, customs, anti-terrorism, security and other fields

Thermo Scientific ™ RIIDEye Portable Radiation Analyzer

Accurately identify radionuclides, and expand the ANSI compatible library of 88 nuclides to 125

- Hysteresis patented technology provides a 97% confidence rate for nuclide identification within 2 seconds
- Real-time display of isotope measurement rate, QCC patented spectrum analysis technology can identify mixed isotope within 1 second
- With functions such as nuclide identification, energy spectrum analysis, measurement, measurement rate calculation, total measurement and data report

Thermo Scientific ™ FH 40G Series NBR γNBR γ Measurement Equipment

Fast response, high sensitivity
Can be used to screen human radioactivity

- Adopting dual sodium iodide and plastic scintillator detectors, patented natural local subtraction technology (NBR), with excellent energy response and radiation response capabilities
- The FHT 672E-10 detector has extremely high sensitivity, especially suitable for detecting hidden radiation sources, and measuring the environmental dose equivalent rate H* (10)
- Widely used in the fields of homeland security, environmental monitoring and emergency response

Radiation Measurement Technology – Scenarios

Identify lost radioactive sources

- In June 2007, a radioactive source was lost in Hebei Province
- Searching for radioactive sources in the ruins of the Wenchuan earthquake in Sichuan in 2008
- In June 2013, the Am-241 radioactive contamination incident of a foundry company in Tangshan, Hebei
- In May 2014, Nanjing Industrial Flaw Detection Radioactive Source Ir-192 Loss Event

Emergency monitoring after a nuclear accident

- Leakage at the Fukushima nuclear power plant in Japan in March 2011

Emergency Plan for Nuclear Attack

- Responding to "dirty bomb" attacks

ThermoFisher SCIENTIFIC

Thermo Scientific ™ AQ4700 Portable Water Toxicity Analyzer

Using luminescent bacteria for biological toxicity detection

Features:

- Simple, fast and sensitive operation
- It can detect the comprehensive biological toxicity of a variety of samples, in line with the international standard ISO11348
- T he instrument is small and light, equipped with a carrying case, suitable for field operation

Application: Water toxicity analysis in various fields such as environmental pollution and emergency accidents helps to determine the scope of pollution and decontamination measures

Thermo Scientific ™ Orion Star A Series Portable multi-parameter Water Analyzer

Features:

Simultaneous measurement of parameters such as pH/ISE (ion concentration)/conductivity/dissolved oxygen

Can save 5000 sets of measurement data, in line with GLP standards

Portable waterproof design, protection grade IP67

Application:

On-site and laboratory water quality analysis

Soil Detection Solution

Thermo Scientific ™ XL3/5 Handheld XRF Analyzer

- Using X-ray fluorescence spectroscopy technology, non-destructive testing, fast speed, simple operation, the whole process only takes a few seconds to complete
- Closed design, waterproof, dustproof and corrosion-proof, can be used in various environments
- Suitable for rapid detection of metal materials, soil heavy metal pollution, etc.
- Fast and non-destructive identification of elements in explosives

Explosive Type	Main Elements	XRF Rapid Assessment
Black powder	Potassium nitrate, sulfur, charcoal	K, S
Detonator	Lightning mercury [Hg(ONC)2], lead azide Pb(N3)2	Hg、Pb
Fireworks	Potassium chlorate, potassium perchlorate, sulfur, metal powder (Al, Mg, Cu, Ti)	K、S、Al, Mg, Cu, Ti、Rb、Cs、Sr
Permanganate	Potassium permanganate, sulfur, graphite	K、Mn、S
Thermit	Iron oxide, aluminum powder	Fe、Al

Thermo Fisher has 70,000 employees in more than 50 countries around the world
to serve the global scientific causes

Thank You !

ThermoFisher SCIENTIFIC

城市公共安全风险评估标准研究

中国标准化研究院
公共安全标准化研究所 张超

城市公共安全风险评估标准研究

1. 研究背景
2. 国内外现状
3. 研究进展
4. 展望

城市公共安全风险评估标准研究

1. 研究背景
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4. 展望

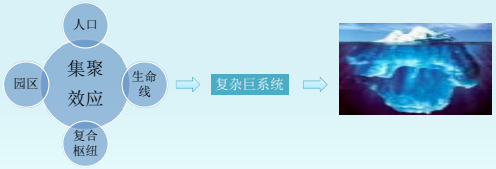
研究背景

我国城市化发展迅速

2000年—2018年我国城市化率　　城市化率发展趋势

研究背景

城市集聚效应与风险



城市发展中的集聚效应　　集聚效应加大了城市风险

研究背景

城市常规运行风险

城市运行

经济功能—生产运行
生活功能—生活运行
社会功能—社会运行

生产运行安全
生活运行安全
社会运行安全

研究背景

城市非常规突发事件风险

非常规突发事件

- 2008年年天津大暴雨
- 2014年12月31日上海外滩踩踏事故
- 2015年8月12日 天津滨海危化品爆炸事故
- 2016年12月20日河南省特大事故
- 2019年3月21日江苏响水危化品爆炸事故

研究背景

应急体系建设－风险

完善突发事件风险管控体系

- 建立健全突发事件风险评估标准规范
- 开展全国自然灾害综合风险调查
- 加强安全生产风险管控和隐患排查治理体系
- 构建全过程、多层级环境风险防范体系
- 健全公共卫生、食品药品安全检验检测和风险防控体系
- 完善立体化社会治安防控体系
- 提高关键信息基础设施的风险防控能力

研究背景

安全发展城市－风险

2020

建成一批与全面建成小康社会目标相适用的安全发展示范城市

2035

建成与基本实现社会主义现代化相适应的安全发展城市。

加快建成以中心城区为基础，带动周边、辐射县乡、惠及民生的安全发展型城市

研究背景

双重预防机制－风险

构建双重预防机制

- 全面开展安全风险辨识
- 科学评定安全风险等级
- 有效管控安全风险
- 实施安全风险公告警示
- 建立完善隐患排查治理体系

研究背景

着力加强风险管理

2019年11月29日，中共中央政治局第十九次集体学习——我国应急管理体系和能力建设

我国各类事故隐患和安全风险交织叠加、易发多发，影响公共安全的因素日益增多。

要加强风险评估和监测预警，加强对危化品、矿山、道路交通、消防等重点行业领域的安全风险排查，提升多灾种和灾害链综合监测、风险早期识别和预报预警能力。

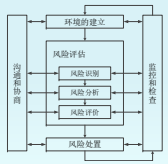
研究背景

城市公共安全风险评估实践需求

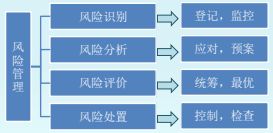
北京
上海
广东
成都
天津
重庆
青岛
泉州
……

研究背景

风险管理助力城市安全



风险管理框架



城市公共安全风险管理

城市公共安全风险评估标准研究

国内外现状

标准与规范性文件

风险评估相关国际、国外标准

标准编号	标准名称
ISO 31000	风险管理 原则与指南
ISO/IEC 31010	风险管理 风险评估技术
SA/SNZ HB 436：2013	风险管理导则
SA/SNZ HB 89：2013	风险管理-风险评估技术导则

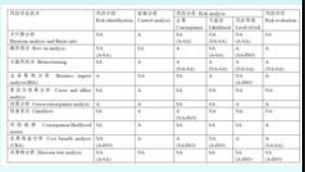
风险评估相关国家、地方标准

标准编号	标准名称
GB/T 23694-2009	风险管理术语
GB/T 24353-2009	风险管理 原则与实施指南
GB/T 27921-2011	风险管理 风险评估技术
DB 11/T 1478-2017	生产经营单位安全生产风险评估规范（北京）
DB41/T 1645-2018	区域安全风险评估规范（河南）
DB37/T 3546-2019	城市安全风险评估导则（深圳）
DB 4406/T 4-2019	城市安全风险评估导则（山东）

国内外现状

ISO 31000 系列标准

风险管理原则、框架、流程

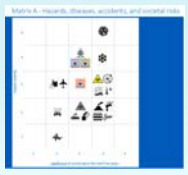


风险评估方法

国内外现状

英国城市公共安全风险登记

英国城市风险登记



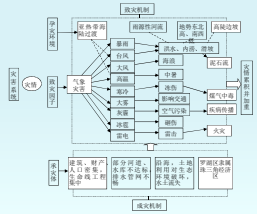
英国国家风险登记

国内外现状

我国城市公共安全风险评估

基本框架

- 1. 评估背景
- 2. 评估方法与依据
- 3. 自然灾害风险评估
- 3.1 气象灾害风险评估
- 3.1.1 气象灾害系统要素
- 3.1.2 气象灾害现状分析
- 3.1.3 气象灾害主要隐患分析
- 3.1.4 风险识别结果
- 4. 事故灾害风险评估
- 5. 公共安全风险评估
- 6. 社会安全风险评估
- 7. 风险应对措施
- 附件一 X区公共安全风险源（点）汇总
- 附件二 常用风险评估方法简介



我国X市公共安全风险评估

国内外现状

我国城市公共安全风险评估

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1）台风
X区台风成灾的主要原因是台风带来的强风、暴雨和风暴潮，影响海陆空交通、港口码头和建筑工地安全，造成树木和广告牌倒塌伤人和内涝等灾害。罗湖区2010~2012年，共遭遇台风11次，其中，2010年共有4个台风对罗湖区造成影响，分别为“灿都”、“狮子山”、“莫兰蒂”、“凡亚比”，4个台风造成的气象灾害均较轻，影响相对严重的为“灿都”；2011年共有2个台风对罗湖区造成影响，分别为“海马”、“纳沙”，2个台风造成的气象灾害相对较轻；2012年影响罗湖区的台风数为5个，影响的严重程度是近几年中较为严重的一年，以“韦森特”风雨影响最为突出，“韦森特”是近10年来造成罗湖区过程雨量最多、降雨持续时间最长的台风。

我国X市公共安全风险评估

国内外现状

我国城市公共安全风险评估

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X区主要风险隐患一览表

序号	风险隐患名称	致灾因子	分布区域
1	台风诱发洪涝灾害	台风（强降雨、风暴潮）	全区
2	大风浓雾引发海陆空交通事故	大风、大雾	空港、海上交通、城市快速道路
3	雷击损伤	雷电	户外电子设备、开敞空间人群
4	空气污染	灰霾	全区
5	高温中暑	高温	X区相对封闭的作业空间

我国X市公共安全风险评估

国内外现状

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X区气象灾害风险源清单

序号	风险源名称	事件类别	事件子类	风险简要描述	重点潜在风险区	影响对象和形式
1	台风致灾	自然灾害	气象灾害	台风带来强风、暴雨和风暴潮，影响海陆空交通、户外作业区安全，树木和广告牌等耸立物倒塌伤人和洪涝灾害。	交通、港口码头和建筑作业工地	交通系统中断或瘫痪、户外作业事故、高耸物倒塌伤人、洪涝淹没
2	高温致灾	自然灾害	气象灾害	气温在35℃以上高温天气引起火灾、人体中暑等。	森林、易燃仓储区、封闭作业环境	区域火灾、作业人员中暑、城市供电超负
3	雷电致灾	自然灾害	气象灾害	伴有闪电和雷鸣的放电现象。常伴有强烈的阵风和暴雨，产生雷击事件损毁生命财产。	高层建筑、公共开放空间	高层建筑、高耸结构受损，公共开放空间人员伤亡
4	大雾致灾	自然灾害	气象灾害	逆温现象造成空气对流运动较差，能见度低、害气体积聚影响交通安全、人体健康。	交通系统、户外人员	交通系统中断或瘫痪、户外人员健康受损
5	灰霾致灾	自然灾害	气象灾害	大量微小尘粒、烟粒或盐粒的集合体大气中，使空浑浊，水平能见度降低到10公里以下，影响交通安全、人体健康。	交通系统、户外人员	交通系统中断或瘫痪、户外人员健康受损

我国X市公共安全风险评估

国内外现状

我国城市公共安全风险评估

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- 附件二 常用风险评估方法简介

- 应急管理平台建设
- 预案体系建设
- 应急队伍
- 应急物资储备
- 应急演练

我国X市公共安全风险评估

国内外现状

我国城市公共安全风险评估

基本框架

- 1 总则
- 1.1 风险评估的定义
- 1.2 风险评估的目的
- 1.3 风险评估的范围
- 1.4 风险评估的原则
- 2 风险评估准备
- 2.1 制定评估方案
- 2.2 描述评估区域
- 2.3 工作保障及动员
- 3 风险识别
- 3.1 风险识别的对象
- 3.2 风险识别的方法
- 3.3 风险识别的程序
- 4 风险分析
- 4.1 风险场景描述
- 4.2 可能性分析
- 4.3 后果分析
- 4.4 风险水平确定

基本框架

- 5 风险评价
- 5.1 风险比较与排序
- 5.2 编制具有优先级的风险列表
- 6 风险处置
- 6.1 风险处置的原则
- 6.2 风险处置的手段
- 7 风险沟通与监测
- 7.1 风险沟通
- 7.2 风险监测
- 8 附录
- 8.1 适用范围
- 8.2 风险管理的基本流程
- 8.3 X区风险评估基本信息描述表
- 8.4 突发事件风险列表
- 8.5 场景描述模板
- 8.6 X区损害参数临界值设定
- 8.7 风险分析模板
- 8.8 风险矩阵图（分级参考表）

我国X市公共安全风险报告框架

国内外现状

我国城市公共安全风险评估

风险评估基本信息描述表

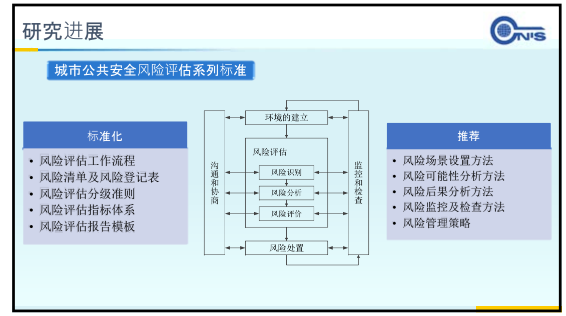
分类	构成	具体情况	信息来源
人	人口数量		
	人口密度：人/平方公里		
	人口结构：男女比例，民族结构，年龄比例		
	人口户数：常住和流动，城镇和乡村		
经济	经济成果：地区生产总值，三次产业产值及比例		
	人均收入水平：城市及农村居民收入		
	财政收入		
基础设施	通讯设施		
	交通设施		
	大型水利设施		
	电力基础设施		
	石油天然气设施		
	城市基础设施		
自然生态	地理位置、地形地貌		
	气候与水文		
	保护区		
重要场所	涉外场所		
	公众聚集场所		
	重要部门		
	重点涉危险源单位		

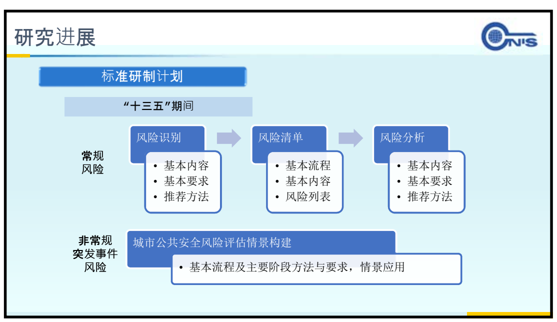
XX突发事件风险识别表

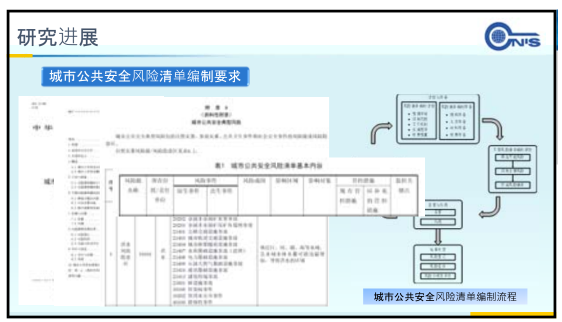
风险编码	事件	描述		
		原因描述	后果描述	
			影响形式	影响对象

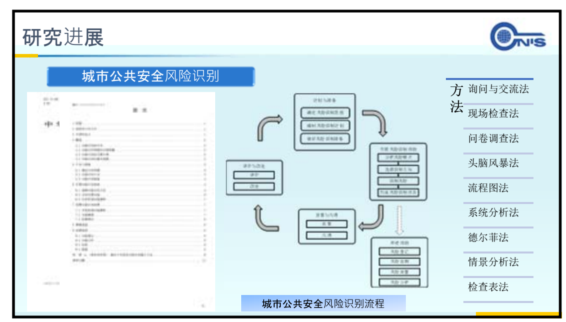

国内外现状
我国城市公共安全风险评估
X市公共安全风险评估指标体系


城市公共安全风险评估标准研究
3
研究进展


研究进展
城市公共安全风险评估系列标准
标准化
风险评估工作流程
风险清单及风险登记表
风险评估分级准则
风险评估指标体系
风险评估报告模板
环境的建立
风险评估
风险识别
风险分析
风险评价
风险处置
沟通和协商
监控和检查
推荐
风险场景设置方法
风险可能性分析方法
风险后果分析方法
风险监控及检查方法
风险管理策略


研究进展
标准研制计划
"十三五"期间
常规风险
风险识别
基本内容
基本要求
推荐方法
风险清单
基本流程
基本内容
风险列表
风险分析
基本内容
基本要求
推荐方法
非常规突发事件风险
城市公共安全风险评估情景构建
基本流程及主要阶段方法与要求，情景应用


研究进展
城市公共安全风险清单编制要求
城市公共安全风险清单编制流程


研究进展
城市公共安全风险识别
方法
询问与交流法
现场检查法
问卷调查法
头脑风暴法
流程图法
系统分析法
德尔菲法
情景分析法
检查表法
城市公共安全风险识别流程

研究进展

城市公共安全风险分析

城市公共安全风险分析流程

方法：贝叶斯分析、模糊图法、业务影响分析、因果分析、事件树分析、危险与可操作性分析、人因可靠性分析、情景分析、德尔菲法、仿真计算

研究进展

城市公共安全风险分析

城市公共安全单一风险源风险分析模板

单一风险源风险分析流程

研究进展

城市公共安全风险评估情景构建

城市公共安全风险评估情景构建流程

研究进展

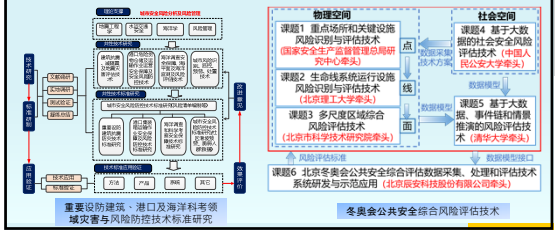
科研项目支持

城市公共安全风险评估系列标准研究获得的项目支持

序号	项目/课题名称	相关内容	状态
1	“城市安全风险防控技术标准研究”（重点研发项目，2018YFF0213304）	研制城市公共安全风险清单编制要求标准	在研
2	“冬奥会公共安全综合风险评估技术”（重点研发项目，2018YFF0301000）	研制城市公共安全风险识别、风险分析和情景构建标准	在研
3	冬奥会安全风险评估技术、标准研究及应用（总局技术保障项目，2019YJ059）	研制冬奥会风险评估相关标准	在研

研究进展

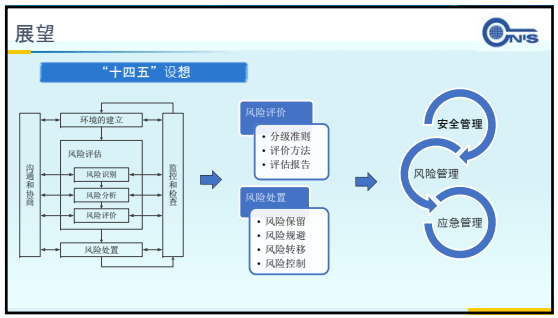
科研项目支持

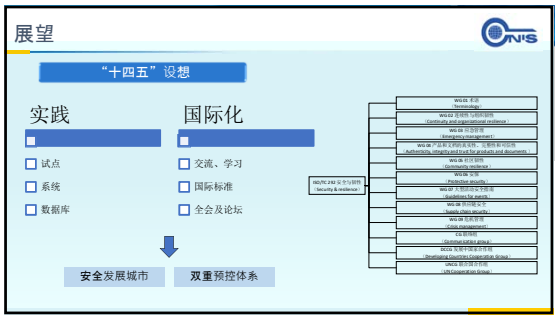


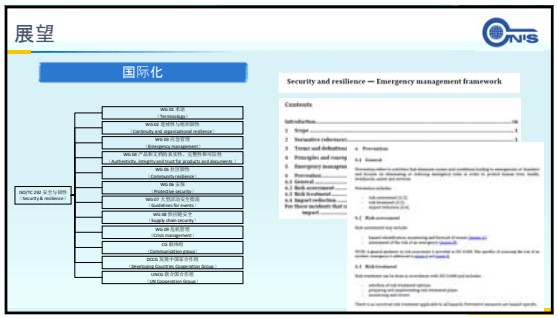
重要设防建筑、港口及海洋科考领域灾害与风险防控技术标准研究

冬奥会公共安全综合风险评估技术

城市公共安全风险评估标准研究

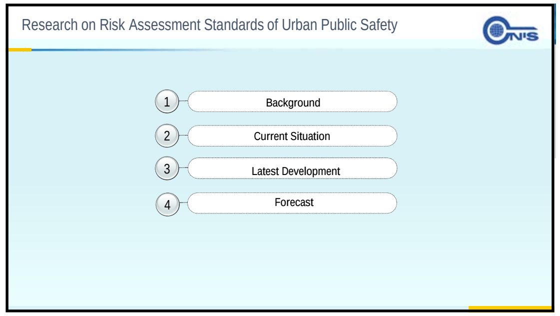

展望
“十四五”设想
环境的建立
风险评估
风险识别
风险分析
风险评价
风险处置
沟通和协商
监控和检查
风险评价
• 分级准则
• 评价方法
• 评估报告
风险处置
• 风险保留
• 风险规避
• 风险转移
• 风险控制
安全管理
风险管理
应急管理

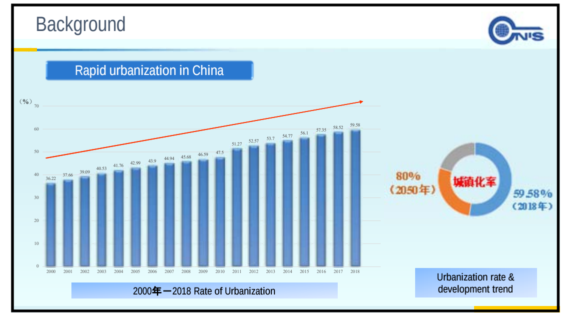

展望
“十四五”设想
实践
试点
系统
数据库
国际化
交流、学习
国际标准
全会及论坛
安全发展城市
双重预控体系

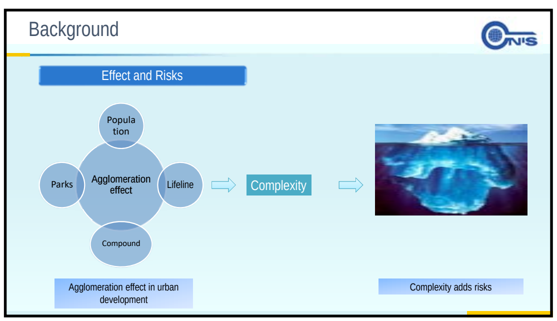

展望
国际化
Security and resilience — Emergency management framework


谢谢！


Risk Assessment Standards of Urban Public Safety
China National Institute of Standardization
Division of Public Safety and Standardization
Zhang Chao


Research on Risk Assessment Standards of Urban Public Safety
1 Background
2 Current Situation
3 Latest Development
4 Forecast


Background
Rapid urbanization in China
80%（2050年）
城镇化率
59.58%（2018年）
2000年—2018 Rate of Urbanization
Urbanization rate & development trend


Background
Effect and Risks
Population
Parks
Agglomeration effect
Lifeline
Compound
Complexity
Agglomeration effect in urban development
Complexity adds risks


Background
Operational Risks
城市运行
经济功能—生产运行
生活功能—生活运行
社会功能—社会运行
生产运行安全
生活运行安全
社会运行安全


Background
Unconventional Emergencies
非常规突发事件

Background

Risks Management within Emergency Management Framework

Improve the emergency risk management and control system

- Establish and improve emergency risk assessment standards
- Conduct a national comprehensive risk survey of natural disasters
- Strengthen safety production risk management and control and hidden danger investigation and governance system
- Build a whole-process, multi-level environmental risk prevention system
- Improve public health, food and drug safety inspection and testing and risk prevention and control systems
- Improve the three-dimensional social security prevention and control system
- Improve the three-dimensional social security prevention and control system

Background

Risk for Urban Safety

2020

Build a group of safe development demonstration cities that are compatible with the goal of building a well-off society in all respects

2035

Build a safe and developed city that is compatible with the basic realization of socialist modernization.

Accelerate the establishment of a safe development city based on the central urban area, driving the surrounding areas, radiating counties and townships, and benefiting the people's livelihood

Background

Dual Prevention System on Risk

Construct double prevention mechanism

- Carry out security risk identification
- Scientifically assess the safety risk level
- Effectively manage security risks
- Implement security risk announcement warning
- Establish and improve the hidden danger investigation and management system

Background

Strengthen Emergency Management

On November 29, 2019, the 19th collective study of the Political Bureau of the CPC Central Committee – emergency management system and capacity building.

The hidden dangers and safety risks of various accidents in our country are intertwined and prone to occur frequently, and the factors affecting public safety are increasing.

It is necessary to strengthen risk assessment and monitoring and early warning, strengthen the safety risk investigation of key industries such as hazardous chemicals, mining, road transportation, and fire protection, and improve the comprehensive monitoring of multi-hazards and disaster chains, early risk identification, and early warning capabilities.

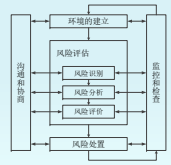
Background

Risk Assessment Principles

Beijing
Shanghai
Shangdong
Chendong
Tianjin
Chongqin
Qingdao
Quanzhou
.....

Background

Risk Assessment & Urban Safety



Risk Management Framework

风险管理

- 风险识别 ⇨ 登记，监控
- 风险分析 ⇨ 应对，预案
- 风险评价 ⇨ 统筹，最优
- 风险处置 ⇨ 控制，检查

Urban City Risk Management

Current Situations

Standards & Guiding Principles

International and foreign standards related to risk assessment

Standards	Title
ISO 31000	Risk management – Guidelines
ISO/IEC 31010	Risk management – Risk assessment techniques
SA/SNZ HB 436：2013	Risk management guidelines
SA/SNZ HB 89：2013	Risk management guidelines

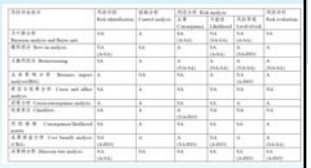
National and local standards related to risk assessment

Standards	Title
GB/T 23694-2009	Risk management terms
GB/T 24353-2009	Risk management principles and implementation guidelines
GB/T 27921-2011	Risk Management Risk Assessment Technique
DB 11/T 1478-2017	Safety Production Risk Assessment Specification for Production and Business Units (Beijing)
DB41/T 1645-2018	Regional Security Risk Assessment Specification (Henan)
DB37/T 3546-2019	Regional Security Risk Assessment Specification (Shenzhen)
DB 4406/T 4-2019	Regional Security Risk Assessment Specification (Shandong)

Current Situations

ISO 31000 Standards

Risk management principles, framework and process



Risk assessment method

Current Situations

UK Urban Safety Risk Registry

UK City Risk Registry

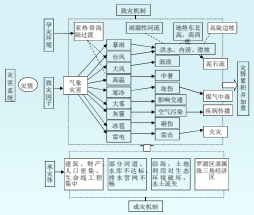
UK Country Risk Registry

Current Situations

Risk Assessment for China Urban Safety

Basic Framework

- 1. Assessment background
- 2. Evaluation method and basis
- 3. Natural disaster risk assessment
- 3.1 Weather disaster risk assessment
- 3.1.1 Elements of Meteorological Disaster System
- 3.1.2 Analysis of the status quo of meteorological disasters
- 3.1.3 Analysis of main hidden dangers of meteorological disasters
- 3.1.4 Risk identification results
- 4. Accident disaster risk assessment
- 5. Public safety risk assessment
- 6. Social Security Risk Assessment
- 7. Risk response measures
- Annex 1 Summary of Public Security Risk Sources (Points) in Area X
- Annex II Introduction to common risk assessment methods



Current Situations

Risk Assessment for China Urban Safety

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1) Typhoon

The main cause of the typhoon disaster in Area X is the strong wind, heavy rain and storm surge brought by the typhoon, which affect the safety of sea, land and air transportation, ports and docks and construction sites, and cause the collapse of trees and billboards, injury and waterlogging. Luohu District encountered 11 typhoons from 2010 to 2012. Among them, 4 typhoons affected Luohu District in 2010, namely "Santo", "Lion Rock", "Morani" and "Fanyabi" , The meteorological disasters caused by the 4 typhoons were relatively minor, and the relatively serious impact was "Santo"; in 2011, there were 2 typhoons that affected Luohu District, namely "Haima" and "Nasa", and 2 typhoons caused Meteorological disasters are relatively mild; the number of typhoons affecting Luohu District in 2012 was 5, and the severity of the impact was the most serious in recent years. The impact of wind and rain in "Vicente" was the most prominent, and "Vicente" was The typhoon that caused the most rainfall and the longest rainfall duration in Luohu District in the past 10 years.

Current Situations

Risk Assessment for China's Urban Safety

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#	Risk	Source	Scope and Distribution
1	Typhoon induced flood disaster	Typhoon (strong rainfall, storm surge)	All
2	Strong winds and thick fog cause traffic accidents by sea, land and air	Strong wind and fog	Airport, maritime traffic, urban expressway
3	Strong winds and thick fog cause traffic accidents by sea, land and air	Thunder and lightning	Outdoor electronic equipment, open space crowd
4	Air pollution	Haze	All
5	High temperature	Heat	Relatively closed working space in X area

Current Situations

Risk Assessment for China's Urban Safety

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序号	风险源名称	事件类别	事件子类	风险源要描述	重点潜在风险源	影响对象和形式
1	台风暴灾	自然灾害	气象灾害	台风带来强风、暴雨和风暴潮，影响海陆空交通，产外作业区安全，树木和广告牌等立物倒塌伤人和洪涝灾害。	交通、港口码头和建筑作业工地	交通系统中断或瘫痪，产外作业单位，高耸物倒塌伤人，洪涝淹没
2	高温暴灾	自然灾害	气象灾害	气温在35℃以上高温天气引起火灾、人体中暑等。	森林、易燃仓储区，时间作业环境	区域火灾，作业人员中暑，城市供电超负
3	雷电暴灾	自然灾害	气象灾害	伴有闪电和雷鸣的放电现象。常伴有强烈的阵风和暴雨，产生重击事件和强生命财产。	高层建筑、公共开放空间	高层建筑，高耸结构受损，公共开放空间人员伤亡
4	大雾暴灾	自然灾害	气象灾害	把近现象造成空气对流运动较差，能见度低，雾气体积影响交通安全，人体健康。	交通系统，产外人员	交通系统中断或瘫痪，产外人员健康受损
5	灰霾暴灾	自然灾害	气象灾害	大量微小尘粒、烟粒或盐粒的集合体大气中，使空浑浊，水平能见度降低到1公里以下，影响交通安全，人体健康。	交通系统，产外人员	交通系统中断或瘫痪，产外人员健康受损

Current Situations

Risk Assessment for China's Urban Safety

Basic Framework

- 1. Assessment background
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- Annex 1 Summary of Public Security Risk Sources (Points) in Area X
- Annex II Introduction to common risk assessment methods

- Emergency management platform
- Preparedness system
- Emergency response
- Emergency supplies
- Emergency drills

Current Situations

Risk Assessment for China's Urban Safety

Basic Framework

- 1 General
- 1.1 Definition of risk assessment
- 1.2 The purpose of risk assessment
- 1.3 Scope of risk assessment
- 1.4 Principles of risk assessment
- 2 Risk assessment preparation
- 2.1 Develop an evaluation plan
- 2.2 Describe the assessment area
- 2.3 Job security and mobilization
- 3 Risk identification
- 3.1 Objects of risk identification
- 3.2 Methods of risk identification
- 3.3 Procedure for risk identification
- 4 Risk analysis
- 4.1 Risk scenario description
- 4.2 Possibility analysis
- 4.3 Consequence analysis
- 4.4 Determination of risk level

Basic Framework (Cont.)

- 5 Risk assessment
- 5.1 Risk comparison and ranking
- 5.2 Compile a prioritized risk list
- 6 Risk treatment
- 6.1 Principles of risk disposal
- 6.2 Means of risk treatment
- 7 Risk communication and monitoring
- 7.1 Risk communication
- 7.2 Risk monitoring
- 8 appendix
- 8.1 Scope of application
- 8.2 The basic process of risk management
- 8.3 Description Form of Basic Information of Risk Assessment in Area X
- 8.4 Emergency Risk List
- 8.5 Scene description template
- 8.6 X zone damage parameter critical value setting
- 8.7 Risk Analysis Template

Current Situations

Risk Assessment for China's Urban Safety

Risk Assessment Basic Information Report

分类	构成	具体情况	信息来源
人	人口数量		
	人口密度：人/平方公里		
	人口结构：男女比例、民族结构、年龄比例		
	人口产散、常住和流动，城镇和乡村		
经济	经济成果：地区生产总值、三次产业产值及比例		
	人均收入水平，城市及农村居民收入		
	财政收入		
基础设施	通讯设施		
	交通设施		
	大型水利设施		
	电力基础设施		
	石油天然气设施		
	城市基础设施		
自然生态	地理位置、地形地貌		
	气候与水文		
	保护区		
重要场所	涉外场所		
	公众聚集场所		
	重要部门		
	重点涉危险源单位		

Emergency Risk Identification Form

风险编码	事件	描述			
		原因描述	后果描述		
			影响形式	影响对象	

Current Situations

Risk Assessment for China's Urban Safety

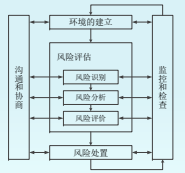
风险分析数据信息	场景描述	编号	类别	细节	参数	单位	损害参数	损害指标总计			
								预警损害L01	损害规模判定依据	后果等级L02	损害值L03
		M	人	M1	死亡人数	人数					
				M2	受伤人数	人数					
				M3	暂时安置人数	人数					
				M4	长期安置人数	人数					
		D	经济	D1	直接经济损失	元					
				D2	间接经济损失	元					
				D3	应对成本	元					
		I	基础设施	I1	饮用水中断	时间，户数					
				I2	电力中断	时间，户数					
				I3	通信中断	人数					
				I4	交通中断	时间					
		E	生态环境	E1	保护区的破坏	面积比例					
				E2	水域影响	公里及公顷					
				E3	土地影响	公顷					
				E4	大气影响	超标倍数，影响人数					
		S	社会环境	S1	社会生活中断	程度					
				S2	政治影响	程度					
				S3	社会心理影响	程度					
风险分析结果		100	总体损害值								
		1001	平均损害值								
		1002	预警概率								
		1003	人口伤亡								

Latest Development

Risk Assessment Standards for Urban Safety

Standardization

- Risk assessment workflow
- Risk list and risk registration form
- Risk assessment classification criteria
- Risk Assessment Index System
- Risk Assessment Report Template



Recommended Principles

- Risk scenario setting method
- Risk probability analysis method
- Risk consequence analysis method
- Risk monitoring and inspection methods
- Risk management strategy

Latest Development

Standards Development Plan

During the "14th Five Year Plan"

Conventional Risk

- Risk Classification
  - Basic contents
  - Basic requirements
  - Recommended method
- Risk Checklist
  - Basic process
  - Basic contents
  - Risk list
- Risk Assessment
  - Basic contents
  - Basic requirements
  - Recommended method

Unconventional Risk

Urban public safety risk assessment scenarios

- Basic process and main phase methods and requirements, scenario application

Latest Development

Drafting Requirements

Urban public safety risk list compilation process

Latest Development

Risk Classification

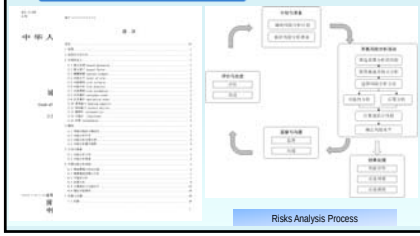
Process for Risk Classification

Method

- Consultation
- Inspection
- Survey
- Brainstorm
- Mapping
- System Analysis
- Delphi method
- Scenario Analysis
- Checklist

Latest Development

Risks Analysis



Risks Analysis Process

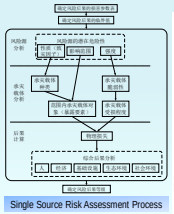
Method

- Bayesian analysis
- Butterfly diagram
- Business Impact Analysis
- Causal analysis
- Comparative Analysis
- Hazard and operability analysis
- Human Reliability Analysis
- Scenario analysis
- Delphi method
- Simulation calculation

Latest Development

Risk Assessment

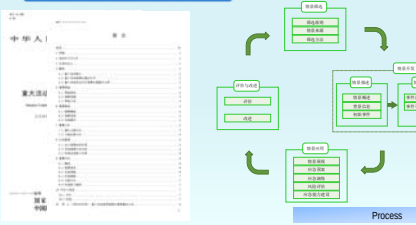
Single risk source risk analysis template for urban public safety



Single Source Risk Assessment Process

Latest Development

Scenario and Simulation



Process

Latest Development

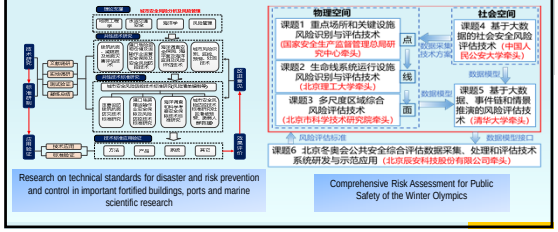
科研项目支持

Awarded Research Projects

#	Title	Summary	Status
1	"Research on Technical Standards for Urban Security Risk Prevention and Control" (Key R&D Project, 2018YFF0213304)	Develop the standards and the urban public safety risk inventory	Active
2	"Comprehensive Risk Assessment Technology for Public Safety of the Winter Olympics" (Key R&D Project, 2018YFF0301000)	Develop standards for urban public safety risk identification, risk analysis and scenario construction	Active
3	Research and Application of Safety Risk Assessment Technology, Standards for the Winter Olympics (2019YJ059)	Develop relevant standards for risk assessment of the Winter Olympics	Active

Latest Development

Research Project Support

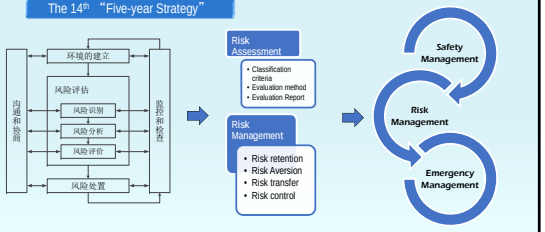


Research on technical standards for disaster and risk prevention and control in important fortified buildings, ports and marine scientific research

Comprehensive Risk Assessment for Public Safety of the Winter Olympics

Forecast

The 14th "Five-year Strategy"



Forecast

The 14th "Five-year Strategy"

Best Practices

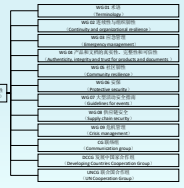
- Pilot
- System
- Database

Internationalization

- Exchange
- International standards
- Conference and webinar

Safety Development

Dual scheme



Forecast

Internationalization