

AIGA 2006 MEETING

TRANSPORTATION SAFETY 运输安全



Asia Industrial Gases Association

**12-13 SEPTEMBER 2006
SHANGHAI**

Plan 计划

- Review of some accidents 事故回顾
- Human resources: Driver selection 人力资源：驾驶员挑选
- Training for drivers and managers 驾驶员和经理的培训
- Vehicle standards 车辆标准
- Road safety management 道路安全管理
- Driving and working time 驾驶及工作时间
- Monitoring 监控
- Road vehicle emergency and recovery 道路车辆紧急状况及恢复
- Safety adviser 安全顾问
- Security 安全
- EIGA 欧洲工业气体协会
- Conclusion 结论

Crash with a truck , 2 fatalities, America 美国，与卡车相撞，2死。



- At 4:45 am, a **vehicle slipped in a curve** and crashed the AL truck
- 2 fatalities in the destroyed vehicle
- No injury to the driver of the truck
- No spill

Rollover of a Medical Oxygen Semi-trailer Europe

欧洲，医用氧气半挂车侧翻



- At 7 am, the **driver came too far out of the roadside** when meeting another truck coming the opposite way
- Dark weather, narrow and slipper road in a curve
- No injury, no spill

Rollover of a LIN Semi trailer Europe

欧洲，液氮半挂车侧翻



- The AL road tanker was **hit in the rear** by a third party car
- The driver could not compensate the movement of the semi-trailer
- The road tanker tipped over
- Minor injury, no product spill

LIN Tanker Accident – Africa

非洲，液氮槽车事故



- Whilst driving up a mountain pass, the driver was allegedly **forced off the road** by an overtaking truck which caused the N2 tanker & **horse** to go down a ravine.
- No injury

Rollover of a LIN Semi trailer Driver injury Europe

欧洲，液氮半挂车翻车，司机受伤



- A LIN tanker **missed a curve** and overturned in a cliff sloping ground
- No other vehicle involved, road in curve, rainy weather
- Driver severely injured
- Gas released to the atmosphere, as transfer was impossible

Rollover of an Hydrogen semi-trailer Europe 欧洲，氢气半挂翻车



- The driver overtook a truck on the right side, in order to avoid a crashed car which was stopped on the left lane of the motorway
- The AL tube trailer **hit the truck on the rear** and rolled over
- At night, rainy weather
- 1 fatality, AL contractor injured
- No leak of hydrogen

Third Party - Fatalities Vehicle Accident Asia

亚洲，第三方死亡事故



- Transport contractor was driving with 11,000 liters of LIN in a 17,000 liters ISO container, using a 40' flat bed trailer.
- At 9 pm, a passenger **bus coming from the opposite direction collided** with the trailer
- Bus driver and 2 passengers were killed instantly. 1 passenger incurs multiple injuries while the co-driver suffers minor injuries.
- Trailer's driver and **attendant** were not injured, no spill reported

Fatal Cylinder truck road accident – Asia

亚洲，钢瓶卡车道路死亡事故



- At 4 am, a private car **hit the the front wheel of the AL truck**
- The tire burst and the AL truck tilted
- Cylinder fell down on the road
- The car driver died

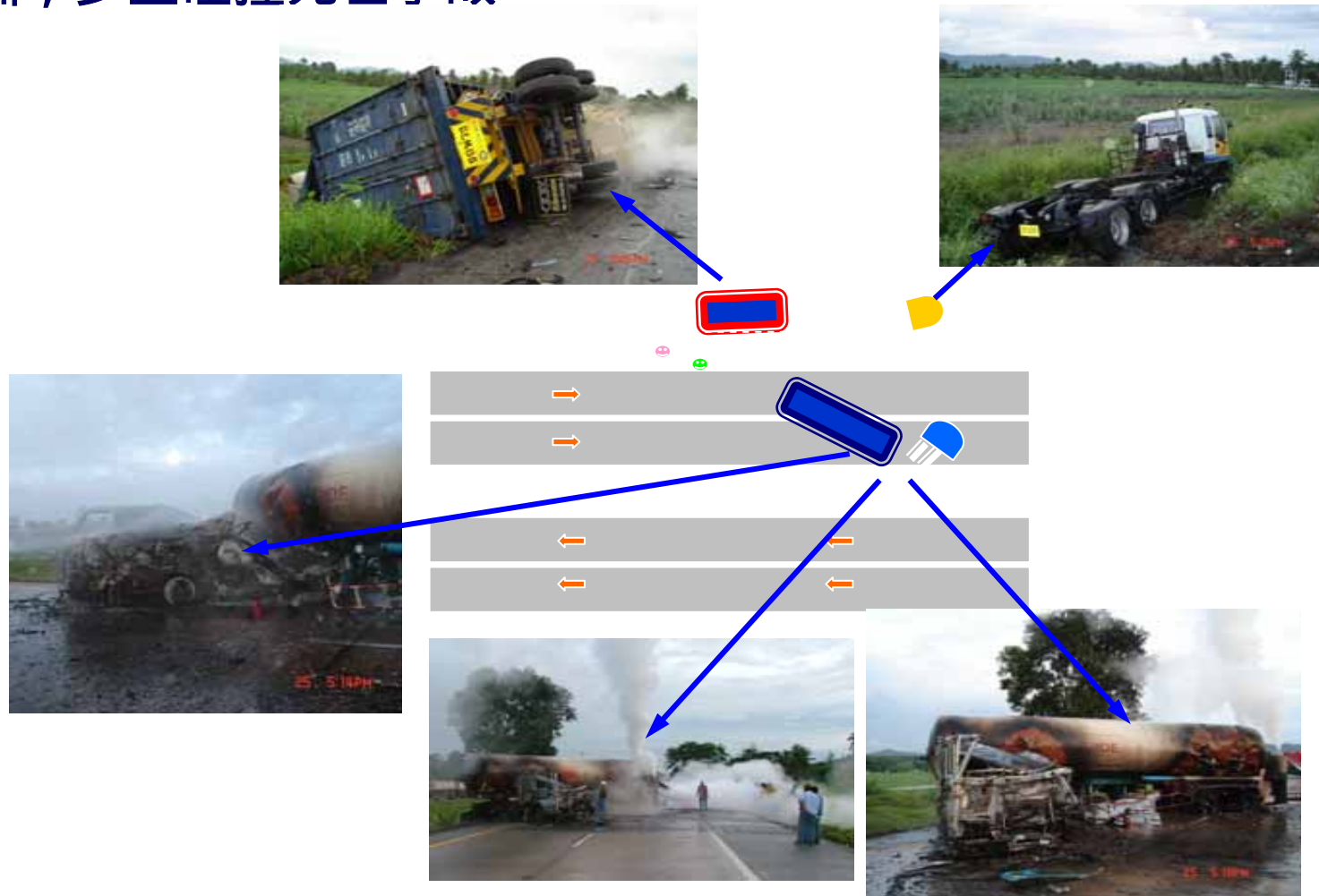
Rollover of a LIN tanker Asia

亚洲，液氮车辆侧翻



- Driving at night, the driver snapped a few seconds and the LOX semi-trailer collided with a big tree on the road side. The impact broke down and uprooted the tree.
- The driver was thrown out from the cabin and received minor injury on forehead
- Major damage to the vehicle
- No other vehicle or person was involved in the accident
- No LOX spillage was observed

Multiple collision with fatalities Asia 亚洲，多重碰撞死亡事故



- Driving at night, a LIN driver coming back to the site to reload the semi trailer **crashed another trailer which was parked for repairs on the left side of the road**. One of the two drivers repairing the broken down trailer died on the spot. The Air Liquide co-driver got his legs burnt

Rollover of a LIN Trailer America

美洲，液氮槽车翻车事故



- Subcontracted driver lost control of the LIN semi trailer that overturned and fell out of the road after a **collision with another truck**, transporting fruits, that came in the opposite side trying to surpass one third vehicle.
- The driver had small bruises in his head.
- There was material damage to the cryogenic semi trailer and mainly to the truck cabin.

Rollover of a LOX trailer Asia

亚洲,液氧槽车翻车



- 3:00 am
- **Driver sleepy** drove on the side of the road
- The truck right wheels slipped down and truck overturned
- No injury
- LOX was transfilled before recovery

Main causes of accidents 事故主要原因

- Implication of other vehicles 其他车辆的牵连
- Behavior of the drivers 驾驶员操守
 - ✓ Driving mistakes: over speed, overtaking
驾驶操控失误：超速，超车
 - ✓ Non application of driving regulations
没有遵循驾驶规章
- Life Hygiene 生命卫生
 - ✓ Drowsiness, sleepiness 疲劳，
 - ✓ Effects of alcohol, drugs, medications 酒精，药物影响
 - ✓ Driving ability 驾驶能力
- External causes 外部原因
 - ✓ Road infrastructure 道路布局结构
 - ✓ Heavy traffic 繁重的交通压力
 - ✓ Weather conditions 天气情况
 - ✓ Planning changes 调度计划改变
- Equipment 装备
- Non correct loading and securing 没有正确的装载和保护

To remember 记住

- **One rollover per week** in the gas industry worldwide
在全球气体工业领域，每周一起翻车
- Rollover can occur in curves at very low speed
在弯道，即使很低的速度亦可能发生翻车
 - ✓ In roundabouts at less than **24 km/h**
在交叉环形路上车速应低于**24 km/h**
- **Human causes** are the first causes of road accidents
人的原因是道路事故的第一原因

Driver selection 驾驶员挑选

- Same standards for AL employees and contractors
对于液空员工和外包商实施相同标准
- Medical and driving ability examination 驾驶技能和身体检查
- Valid driver's license and driving experience (2 years min)
有效的司机证件和至少2年的驾驶经验
- Examination and practical test on 实践考核科目
 - ✓ Driving 驾驶
 - ✓ driving regulations 驾驶规章
 - ✓ Load limitation and securing 装载限制和保护
 - ✓ Hazards and labelling of products 产品危害和标签
- Good track record 良好的从业记录
- Good working and safe driving records 良好的工作和安全驾驶记录

Drivers training content 驾驶员培训内容

- Product knowledge 产品知识
- Loading and discharging 产品装卸
- Weight limitations, load distribution and securing 装载限制，分配和保护
- Vehicle inspection, tyre care and maintenance 车辆检查轮胎保养与维护
- Roll-over prevention 预防翻车
- Legal requirements of road safety 道路安全法规
- Risks of driving: causes of accidents, sleep related accidents, effects of medications and alcohol
驾驶风险：事故原因，相关睡眠事故，药物和酒精影响
- Defensive driver training 防御性驾驶
- Use of fire fighting equipment 灭火器的使用
- Roll-over prevention training 预防翻车
- Emergency response training 紧急响应培训
- Practical driving and product knowledge tests 实践驾驶和产品知识测试

Example: Driver training and qualification in France (1)

例子：在法国司机培训和资格认证（1）

- Qualification of drivers (AL or contractors) 司机包括外包的资格认证
 - ✓ By the manager after AL security approval 通过液空安全批准后由经理认证
 - ✓ After Initial driving period as a second driver 作为副司机经过初始驾驶阶段后
 - ✓ After training (2 parts) and positive test results 经过两部分培训和肯定的测试结果后
- Part 1: Training content mandatory for transport of dangerous goods 一部分：危险货物运输法定培训
 - ✓ Driving licence 驾驶证
 - ✓ Psychotechnical tests 心里测试
 - ✓ Driving certificate of initial training and of continuous safety trainings to be renewed every 5 years (includes regulatory matters)
准驾资格证初始培训和每隔5年需更新的连续安全培训
 - ✓ Certificate of Training on Dangerous Goods 危险货物培训证件
 - ✓ Specific certificates of training for forklifts, cranes 吊车或叉车的特殊培训资格证
 - ✓ Duration: 32 days every 5 years 为期：每隔5年32天。
 - ✓ By a recognized training organisation 培训通过经过认证的培训组织

Example: Driver training and qualification in France (2)

例子：在法国司机培训和资格认证（2）

■ Part2: Training specific to the activity and products delivered by AL

二部分：针对企业业务及所运产品的专项培训

- ✓ Properties and hazards of gases 气体产品性质和危害
- ✓ Packaging equipment 包装设备
- ✓ Loading and securing 装载和保护
- ✓ Transport equipment for packages and bulk 运输设备种类如槽车, 卡车, 长管拖车
- ✓ Filling and delivering liquid products: 液体产品的装卸
- ✓ Regulations and on-board documents 规章及随车文件
- ✓ Retraining every 5 years minimum 最少每5年再培训

Defensive driving exercise at APTH in France



Training content for Managers and Supervisors

对经理和主管的培训内容

- Road safety policy 道路安全政策
- Subsidiary Road Safety Standards 公司道路安全标准
- Legal requirement of road safety 道路安全的法定要求
- Info of accidents of the AL Group 液空集团的安全事故信息
- Assessment of drivers 驾驶员的评估
 - ✓ Training effectively passed, including defensive driving
包括防御性驾驶的培训有效的通过
 - ✓ Regular on the road trips with drivers
定期的与司机共同参与运行航次
 - ✓ Leading road safety meetings for drivers
领导对驾驶员的道路安全会

Vehicle Standards 车辆标准

- Compliance with international transport regulations 遵照国际运输规则
- Seat belts 安全带
- ABS brakes (before 2009) ABS刹车
- Tyres inflation pressure and maintenance (max 2 retreads)
轮胎胎压和维护(最多2次翻新)
- Speed limiting device 限速装置
- Highly visible reflective strips 高可见度反光条
- Rear guards and lateral bicycle guards 后部和侧边的保护装置
- Electronic data recording devices 电子数据记录装置
- Drivers must inspect the vehicle before every trip and report any damage or disfunction (mirrors, lights, bumps)
司机必须在每次出车前检查车辆并且汇报任何损坏或问题

Specific devices installed by Cryolor (1) Cryolor安装的特别装置1

■ Position of center of gravity重心位置

- ✓ Baffles 防浪板
- ✓ Low height frame 低高度结构
- ✓ Lowering vessel installation 低的容器安装
- ✓ Flat tires 扁平的车胎
- ✓ Test of tilt angle 测试倾斜角

■ Road equipment 道路装备

- ✓ Disc brakes, ABS 碟刹,ABS
- ✓ EBS: improves stability EBS:提高稳定性
- ✓ Pneumatic suspensions 空气悬挂
- ✓ Lateral guards 侧向保护
- ✓ Rear guards 尾部保护

- Cryolor is the AL cryogenic vessels manufacturer
Cryolor是液空集体低温储槽制造商



Specific devices installed by Cryolor (2)

Cryolor安装的特别装置2

■ Road Safety道路安全

- ✓ Reflective strips反光条
- ✓ Tire flaps轮胎挡泥板
- ✓ Landing legs with rocking feet可定向的支腿



Specific devices installed by Cryolor (3) Cryolor安装的特别装置3

■ Road Safety道路安全

- ✓ Lateral doors 侧边门
- ✓ Bicycle guards 自行车防护栏
- ✓ Fire extinguisher and tire blocs 灭火器和轮档



Specific devices installed by Cryolor (4) Cryolor安装的特别装置4

■ Product safety 产品安全

- ✓ Emergency shut-off button
紧急关闭按钮
- ✓ Remote shut-off valve on liquid line
在液体管线上的远程关闭阀
- ✓ Anti tow away flexible hose
防拖拽软管



Road Safety Management

道路安全管理

- Risk identification for non routine transportation: new customers, new product,..非常规运输的风险判定:新客户,新产品
- Daily risk assessment taking into account available infos: traffic information, road situation, meteorological changes
日常风险评估:交通信息,路况,天气变化
- Route planning shall be made by a competent person
路线计划应由一个有能力的人完成
 - ✓ Avoid congested areas, unsuitable roads, high rate road accident routes
避开拥挤区域,不适合的路段,事故高发路段
 - ✓ Review of deliveries and contingency procedures in extraordinary conditions 在非常规条件下回顾运送及意外应急程序
- Daily communication between route planners and drivers
调度和司机之间的日常交流
- Use of cell phones手机的使用
- Emergency response procedures 紧急情况反应程序

Driving and working time

驾驶与工作时间

- Stop driving in case of drowsiness 有睡意时停止驾驶
- Local legal requirement of maximum driving and working time shall be respected 遵守当地法律规定最大的驾驶和工作时间
- Max working time: 14 h/ 24hours period
最大工作时间:任一24小时内14小时
- Max driving time: 11 h/24 hours period
最大驾驶时间:任一24小时内11小时
- Max period of continuous driving: 4,5 h, including 45 mn rest
最大连续驾驶时间:4.5小时,包括45分钟的休息
- Max weekly driving hours: 56 h 最大每周驾驶时间:56小时
- Working week limited to 6 days 一周最多连续工作六天
- Change in shift pattern requires a break 换班要求休息
- Electronic data recording devices must be checked regularly to monitor driver performance
电子数据记录应按时检查以督控司机工作

Monitoring 监控

■ Monthly reporting 月度报告

- ✓ Accidents, incidents, near misses 事故,事件,未遂事件
- ✓ Vehicle defects 车辆缺陷
- ✓ Non compliance with regulations 未合规项目
- ✓ Results from accident investigations 事故调查结果

■ Qualification of drivers 司机认证

- ✓ Training and retraining scheduling 培训与再培训安排
- ✓ Recording of accidents and bumps 事故记录
- ✓ Reward/demerit system for compliance with procedures
依从程序的奖惩系统

Road Vehicle emergency and Recovery(1)

道路车辆紧急情况与恢复



- EIGA has issued Transport Emergency Instructions for drivers, called TREMCards
EIGA对司机已经发放了运输紧急情况介绍, 叫TREM卡
- EIGA provides guidance for Road Vehicle emergency and recovery
EIGA提供了道路车辆的紧急情况与恢复的指导方针
- US DOT publishes a guide for first responders ERG2004
美国DOT发布了对第一应答者的指导方针的ERG2004
 - ✓ Defines isolation and evacuation distances
定义了隔离和撤退的距离

Road Vehicle emergency and Recovery (2)



- Recovery exercise using air bags
利用气囊恢复演习

Road Vehicle emergency and Recovery (3)



- Recovery exercise with 2 cranes
用2台吊车恢复

The Safety Adviser in Europe 欧洲的安全顾问

- Mandatory by the European transport regulations 欧洲运输规则强制要求
- Responsible for helping to prevent risks (persons, property and environment) 负责帮助预防风险(人,财产和环境)
- Monitors compliance with legal requirements for carriage of dangerous goods 按法律要求监督管理危险品运输车辆
- Prepares an annual report to his management (available to the Authorities at their request)
提供年度报告给管理层,如果政府管理机构要求亦可提供
- Prepares accident reports 准备事故报告
- Monitors practices, driver training, equipment, emergency procedures of all transport operations 监督运输运行中的实践,司机培训,装备,应急程序
- Holds a training certificate issued by the competent authority
保存主管当局签发的培训认证

Europe: Transport Security legal requirements 欧洲:运输安全的法律要求

- Legal requirement per international transport regulations
国际运输业的法律要求
- Recruitment of personnel and selection of contractors
招募新人和选择承包商
- Training and awareness 培训与知晓
- Security coordinator 安全协调人
- Lorry parking: List of all Truck parking areas in Europe
停车:列出所有在欧洲的停车区域
- Maintain security procedures 维护安全程序
- Security on the road: lock doors, keep the vehicle in sight
路途安全:锁门,保持车辆在视线范围内
- Reporting security incidents 报告安全事件
- Communications: provide cell phones to drivers
通讯:提供手机给司机

Actions at EIGA level 在EIGA层面的行动



- WG1: international transport regulations
跟进加强气体行业在国际运输规则的影响
- EIGA (Herman Puype) participates to all UN meetings
参与所有的联合国会议
- WG1 members analyze the transport accidents 成员分析交通事故
- EIGA monitors road vehicle accident statistics
监控道路车辆事故的统计
- EIGA has developed a design for cryogenic gases coupling for tanker filling to avoid mismatch called EUROCOUPLING
设计了叫EUROCOUPLING的防错装接头
- EIGA has prepared TREMCARDS for the drivers in all european languages for emergency situations
使用欧洲各种语言为司机准备了紧急情况下的TREM卡

EIGA publications EIGA出版物



- DOC 54/03: Road vehicle safety programme
道路车辆安全程序
- DOC 56/04: CO2 Tanker driver manual
二氧化碳槽车司机手册
- DOC 63/05: prevention of tow away accidents
预防拖拽事故
- DOC 69/03: Transport Emergency instructions
运输紧急情况说明
- DOC 81/01: Road vehicle emergency and recovery
道路车辆紧急情况及恢复

Conclusion 结论

- Major risk of our industry 我们行业的主要风险
- Highly regulated activity 需要高度控制的行为
- Behavior of drivers and logistics supervisors is key
司机和物流主管的行为是关键
- Continuous training is necessary, even if not mandatory
即使不是强制,持续培训是必要的
- Nominate a Safety Adviser in each transport entity
在每一个运输实体任命一个安全顾问
- Be prepared for emergencies 为紧急情况做好准备
- Develop views of the industry to respond adequately to regulatory bodies
开拓产业视野以充分应对政府和行业新要求

Thank you for your attention

