



Hogeschool Inholland
Hogeschool Inholland
Delft, Netherlands

Risk Control Report
Property / Multi-Discipline

Location: Hogeschool Inholland
Rotterdamseweg 141
Delft 2628AL
Netherlands

Date On Site: 15th June 2017
Consultant: Sander Verboog

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PARTICIPANTS

Name	Title	Company
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SUMMARY AND OPINION OF RISK

The purpose of this audit was to review the loss prevention systems and procedures and the physical layout and arrangement of the facility, and in so doing, identify options for improvement to minimise, at a reasonable cost, the potential physical and business interruption loss exposures.

This site has been graded using the RSA quantitative risk assessment (QRA). This is a method for the assessment of risk quality against commercial/industrial facilities in general. Two elements of risk are examined and compared in order to derive an overall risk quality rating:

- the inherent fire and business interruption hazards associated with the premises, occupancy and operations*
- the risk control features in place to mitigate the inherent hazards*

This facility houses a university of applied studies with mainly theoretical studies. Some studies require workshops or laboratories. There is a limited number of workshops and laboratories and activities are considered low hazardous. This is an ordinary hazard occupancy with a low up to moderate fire load in the majority of the building. Some storage areas in the basement have an increased fire load. They have been installed in cut off areas and they are sprinkler protected.

The building has a fire resistive concrete load bearing structure with large glass panel glazing throughout and combustible roofs. Fire compartments are limited to staircases and elevator shafts, technical rooms in the basement and cable shafts.

With the exception of the outside area underneath the building, the staircases and elevator shafts, the cable shafts and a single storage area in the basement of the building the entire building has been provided with an adequate automatic sprinkler system. A fire originating inside the building would be detected and controlled by this sprinkler system. Some modifications have to be completed to obtain a certificate. Furthermore a storage room in the basement should be provided with sprinklers.

A limited number of cars is parked in the area underneath the building. It is not likely that a fire in this area would spread into the building due to the presence of a heavy concrete fire resistive construction. However, if a car fire would ignite the timber skywalk, a fire could spread into the building and could overtax the sprinkler protection. The fire load inside the building adjacent to the skywalk is low. Secondly a fire originating on a low roof level could spread into the building and overtax the sprinkler system. Roofs are probably combustible and the current hot work procedure is considered inadequate.

The staircases and elevator areas are unprotected. There are no combustible materials and the areas are cut off from the remainder and provided with fire detectors. This is acceptable.

There is no emergency generator. A fire whereby the power supply would be cut off would result in a total loss. The sprinkler system is fed by an electrical pump. The power cable runs from underneath the building directly into the sprinkler pump house in the basement. The exposed cable is rather short.

Human element procedures are generally adequate. The hot work procedure and some housekeeping issues should be resolved.

In the event of a large catastrophe, outsourcing of the majority of the processes to external own and third party buildings may be possible. No agreements exist to execute this. However, the processes are rather simple and it is not expected that outsourcing would cause major problems.

The risk quality rating for this facility is Above Standard with the potential to achieve a Good rating upon completion of the submitted risk improvements.

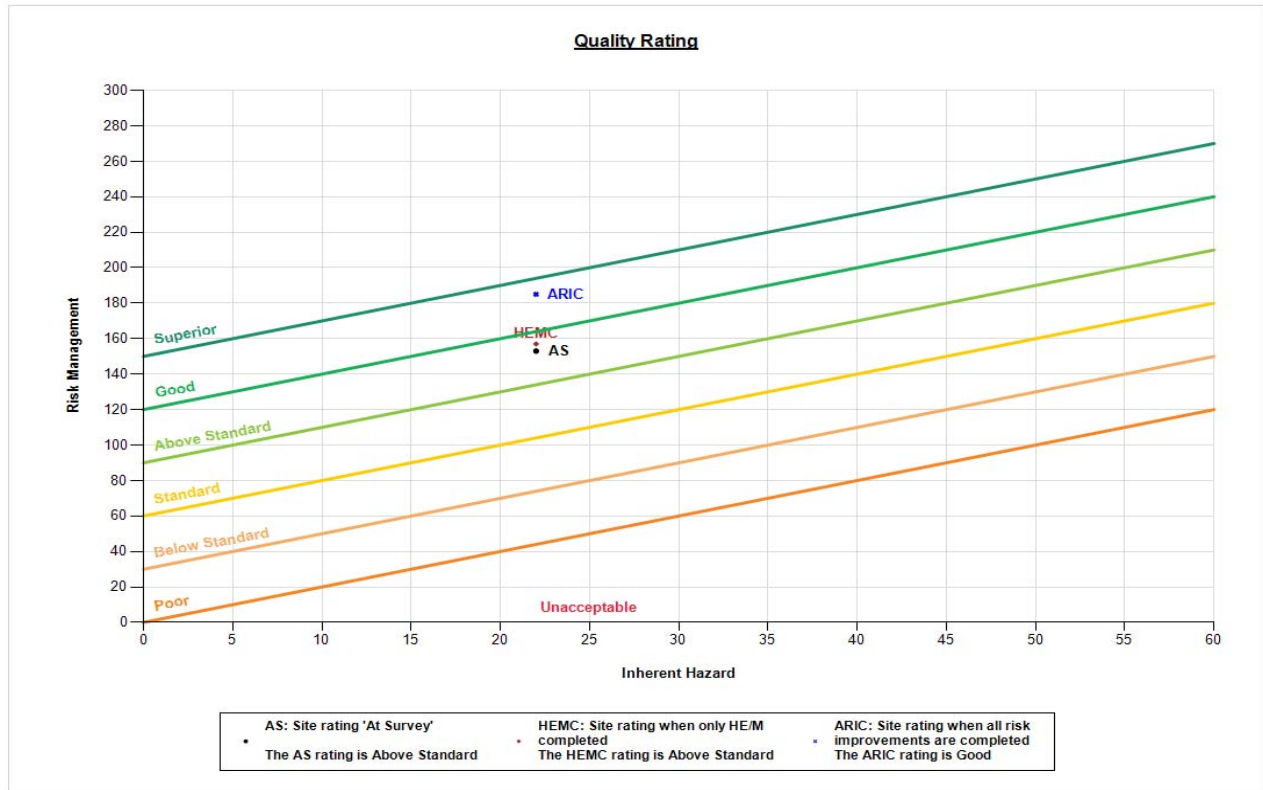
CHANGES SINCE PREVIOUS SURVEY

This is the initial full survey conducted by RSA. There are no significant changes planned on site in the short to midterm and there have been no recent changes on site.

LOSS HISTORY

In 2013 wind storm damage occurred. Plastic roof tiles on the 3rd storey floor damaged the adjacent windows. Following this loss the plastic tiles have been replaced with rubber tiles. Some 20,000 euro was claimed.

QUALITY RATING



Rating: 'Overall Rating' is derived from the 'inherent hazards', e.g. the type of process or storage, the type of construction and exposure hazards, evaluated against the loss control measures and risk management practices that will reduce the likelihood and/or severity of loss.

Superior:	Meets all and exceeds many best-practice risk management standards. All inherent hazards are well controlled.
Good:	Meets most best-practice risk management standards. All key inherent hazards are well controlled.
Above Standard:	Meets all or most normal risk management standards. Most key inherent hazards are well controlled.
Standard:	Meets minimum risk management standards. There may be some deficiencies in the control of inherent hazards.
Below Standard:	Gaps in application of minimum risk management standards. Inherent hazards are not thoroughly controlled.
Poor:	Numerous minimum risk management standards are missing. Inherent hazards are not controlled.
Unacceptable:	The risk has major deficiencies in more than one area (e.g. physical, procedural, process or attitude) that leads to a significant likelihood of a major loss.

RISK IMPROVEMENTS

Category:

Category 1: These are capital expenditure risk improvements with a loss expectancy greater than 25% of the combined property damage and business interruption loss potential. Whilst funding for these items will normally require corporate approval, completion will significantly improve the risk profile of the site.

Category 2: These are risk improvements either with a loss expectancy of less than 25% of the combined property damage and business interruption loss potential or that address important reliability issues. In some cases funding may require corporate approval.

Human Element / Maintenance (HE/M): These risk improvements refer to management practice and procedures. Typically they carry no capital cost but address a wide range of local issues including the control of inception risks and training.

Priority:

- Priority A These Risk Improvements address deficiencies that feature one or both of the following:*
- high-frequency or imminent loss exposures that can typically be resolved by the implementation or improvement of procedures or practices, or by localised physical improvements*
 - loss exposures that are disproportionately large relative to the physical extent of the deficiency, or to the cost to complete the Risk Improvement*
- Priority B These Risk Improvements include procedural items that address loss exposures of moderate frequency, that may be more complex, and/or that are enhancements to existing arrangements. Also included are physical improvements which will reduce the likelihood and/or severity of losses, but that do not meet the criteria for Priorities A or C*
- Priority C These Risk Improvements include items that represent a fundamental change or upgrade in loss control arrangements, probably as part of a longer term risk management strategy. Also included are enhancements to existing systems and practices or longer term projects aimed at achieving "best practice"*

Risk Improvement Summary

RI No	Summary	Category	Priority	Class	Status	Loss Estimate
2017-06:01	Verbeter preventief onderhoud. (General Maintenance)	HE/M	A	Property	AR	N/A
2017-06:03	Verbeter de huishouding. (Housekeeping and Loss Control Self-inspection)	HE/M	A	Property	AR	N/A
2017-06:04	Breid de sprinklerinstallatie uit. (Automatic Sprinkler Protection)	CAT 2	A	Property	AR	EUR 34,759,250
2017-06:02	Implementeer procedure brandgev. werkzaamheden (Permits to Work including Hot Work Controls)	CAT 1	A	Property	AR	EUR 34,759,250

Status Definitions

AR: Awaiting Response. This is the default status for all risk improvements pending site feedback
UR: Under Review, including projects awaiting sign-off and funding
IP: In Process, including projects for which funds have been approved and released and work is starting or due to start
NP: Disagree / No Plans. There are no plans to complete the risk improvement
DA: Deferred by RSA Account Manager

2017-06:01 : Verbeter preventief onderhoud. (General Maintenance)

Risk Improvement:

Implementeer de bevestiging van de glazen gevels van het atrium aan de dragende constructie in het preventief onderhoudsprogramma. Deze wanden zijn destijds als wereldwijd prototype geïnstalleerd en vanuit de fabrikant is er geen onderhoud bekend.

Deficiency:

Een storm kan de constructie van de glazen gevels onder druk zetten waarbij de bevestiging het begeeft door een gebrek aan onderhoud. Een grote stormschade zal het gevolg zijn.

Status:	Awaiting Response	Est. Cost:	Revenue Only	Risk Rating Impact:	Low
Category:	HE/M	Priority:	Priority A	Loss Estimate:	N/A
Class:	Property				

Status Comments:

2017-06:03 : Verbeter de huishouding. (Housekeeping and Loss Control Self-inspection)

Risk Improvement:

Verwijder alle incurante materialen uit de sprinklerpompruimte en de facilitaire ruimte (ruimte K58). Zorg er voorts voor dat de goederen in de laatst genoemde ruimte ten minste 50 cm onder de sprinklerkoppen opgeslagen worden.

Deficiency:

Een brand in een onordelijke ruimte kan zich snel voortplanten en in het geval dat de opslag te hoog is kan de werking van het sprinklersysteem aangetast worden. De kans dat brand ontstaat in onordelijke ruimten is groter dan in ordelijke ruimten. In verband met de aanwezigheid van ontstekingsbronnen en het feit dat technische ruimten goed toegankelijk dienen te blijven voor onderhoudsmensen, dienen dergelijke ruimten te allen tijde vrij te blijven van enige vorm van opslag. Een kleine lokale brand kan vitale bedrijfsinstallaties buiten werking stellen.



Status: Awaiting Response **Est. Cost:** Revenue Only **Risk Rating Impact:** Low

Category: HE/M **Priority:** Priority A **Loss Estimate:** N/A

Class: Property

Status Comments:

2017-06:04 : Breid de sprinklerinstallatie uit. (Automatic Sprinkler Protection)

Risk Improvement:

Breid het sprinklersysteem uit naar opslagruimte K-48E. Het systeem dient te voldoen aan de norm waarop het huidige systeem is gebaseerd.

Deficiency:

Een brand in deze ruimte kan zich ongemerkt uitbreiden en kan zich uiteindelijk voortplanten naar naastgelegen compartimenten. Het sprinklersysteem is vervolgens niet berekend op een dergelijke brand.

Status:	Awaiting Response	Est. Cost:	EUR 5,001 - 10,000	Risk Rating Impact:	Moderate
Category:	CAT 2	Priority:	Priority A	Loss Estimate:	EUR 34,759,250
Class:	Property				

Status Comments:

2017-06:02 : Implementeer procedure brandgev. werkzaamheden (Permits to Work including Hot Work Controls)

Risk Improvement:

Ontwikkel beleid dat tot doel heeft dat brandgevaarlijk werk veilig uitgevoerd wordt. Dit dient te resulteren in het gebruik van een formulier brandgevaarlijk werk en een checklist die gevolgd moet worden voorafgaand aan uitvoering van dergelijk werk. De procedure dient gecommuniceerd te worden met eigen personeel en aannemers. Alleen geautoriseerde mensen mogen werkvergunningen uitschrijven.

In het bedrijf dienen plaatsen aangewezen te worden waar nooit brandgevaarlijk werk uitgevoerd mag worden en plaatsen waar dit is toegestaan. Beoordeel het beleid periodiek en pas het aan waar nodig. Het is noodzakelijk dat het management het beleid ondersteunt. Een strikte controle van brandgevaarlijk werk zal het risico op brand verminderen. Brandgevaarlijk werk kan gedefinieerd worden als elk werk dat open vuur met zich meebrengt, werk dat warmte veroorzaakt, werk dat vonken veroorzaakt zoals slijpen, solderen, lassen.

De volgende maatregelen dienen genomen te worden:

- Maak ruim voor aanvang van de werkzaamheden de uitvoerder bekend met de huisregels.
- Maak voor aanvang van de werkzaamheden de huisregels bekend en laat mensen een vuurvergunning brandgevaarlijke werkzaamheden ondertekenen. De vuurvergunning dient een geldigheid van niet langer dan een dag te hebben. Het bewust omgaan met brandgevaarlijk werk binnen uw bedrijf zal hierdoor vergroot worden.
- Dek voor aanvang van de werkzaamheden brandbare goederen af of verwijder deze. Een medewerker van uw bedrijf dient erop toe te zien dat dit gebeurt.
- Zorg voor voldoende kleine blusmiddelen in de directe omgeving van de werkzaamheden. Een medewerker van uw bedrijf dient erop toe te zien dat dit gebeurt. Zorg voor een brandwacht.
- Zorg ervoor dat de mensen een mobiele telefoon bij zich hebben om in geval van calamiteit zo snel mogelijk alarm te kunnen slaan.
- Controleer samen met de mensen 1 uur na afloop van de werkzaamheden de werkplek op de aanwezigheid van smeulende goederen.
- Voer geen brandgevaarlijke werkzaamheden uit aan het eind van een werkdag.

Door deze procedure zullen mensen zich meer bewust worden van de verantwoordelijkheid die zij op zich nemen. Deze procedure dient voor zowel eigen personeel als voor derden geïmplementeerd te worden.

Deficiency:

Ongecontroleerd brandgevaarlijk werk kan resulteren in brand.

Status:	Awaiting Response	Est. Cost:	Revenue Only	Risk Rating Impact:	Moderate
Category:	CAT 1	Priority:	Priority A	Loss Estimate:	EUR 34,759,250
Class:	Property				

Status Comments:

LOSS ESTIMATES SUMMARY

The sums insured below are based on information provided to RSA.

We define Loss Estimate (LE) as the anticipated monetary loss for any particular scenario including both physical damage and business interruption costs.

Value and Loss Estimate Summary Table

PROPERTY DAMAGE	Total Sum Insured	EML Block		EML		CNLE		TNLE	
	EUR	% of TSI	EUR	% within the EML Block	EUR	% within the EML Block	EUR	% within the EML Block	EUR
Buildings	31,409,000	100	31,409,000	50	15,704,500	25	7,852,250	5	1,570,450
Plant & Equipment	3,814,000	100	3,814,000	100	3,814,000	50	1,907,000	10	381,400
Stock		100		100		50		10	
Other	25,000,000	100	25,000,000	100	25,000,000	100	25,000,000	1	250,000
Total PD Value	60,223,000								
Total PD Loss Estimate			60,223,000		44,518,500		34,759,250		2,201,850
BUSINESS INTERRUPTION	EUR	% of TSI	EUR	Days within the EML Block	EUR	Days within the EML Block	EUR	Days within the EML Block	EUR
Indemnity Period	24 months								
Total BI Value									
Total BI Loss Estimate		100		720		720		5	
Total PD + BI Value	60,223,000								
Total PD + BI Loss Estimate			60,223,000		44,518,500		34,759,250		2,201,850

LOSS ESTIMATE SCENARIOS

EML Block

The largest block of value without adequate fire separation covers the entire building. The EML Block represents 100% of the total sum insured.

The exposed power station and student apartment block are included in this block.

Estimated Maximum Loss (EML)

An estimation of the maximum LE that could be sustained from a single incident, which is considered within the realms of probability but excluding losses that may be possible but remain unlikely. The primary fire protection, detection, or manual response system is ignored (e.g. sprinklers are ignored but credit is given for detection; if no sprinklers exist, detection is ignored), but a normal level of emergency response can be assumed (if applicable).

Excluded loss examples include fire following aircraft impact; fire following earthquake; or other natural catastrophe; and multiple seat arson.

With the automatic sprinkler system impaired, a fire originating anywhere in the building would be unnoticed. The fire would not be stopped as there are only fire resistive walls around the staircases and elevators. Exterior fire spread is likely as the walls consist of non fire resistive glazing. The fire would spread throughout the entire building. A 50% building loss and a 100% content loss cannot be excluded.

In the event of a large catastrophe, it is likely that the majority of the processes could be outsourced to a temporary location elsewhere. Processes are rather simple and it is not expected that outsourcing would cause major problems.

The adjacent exposures are not included in this scenario.

Current Normal Loss Expectancy (CNLE)

The largest LE determined at the time of survey when considering all aggravating and mitigating factors. This can only be equal to or less than the EML.

A fire originating on one of the lower and combustible roofs could spread into the building as the exterior glazing is not fire resistive. A fire could occur as there is no adequate hot work procedure. The fire would be detected by the sprinkler system. However, the system would be overtaxed. The quick arriving fire brigade would encounter a smoke filled facility and would focus on evacuation of the present students and employees. It is expected that the fire brigade would attempt an internal attack due to the fire resistive construction present and low up to moderate fire load throughout. The fire brigade could be credited to stop the fire eventually. Smoke and soot would contaminate the building and water damage would occur on the lower floors. The loss is roughly estimated at 25% of the building and 50% of the content.

In the event of a large catastrophe, it is likely that the majority of the processes could be outsourced to a temporary location elsewhere. Processes are rather simple and it is not expected that outsourcing would cause major problems.

Target Normal Loss Expectancy (TNLE)

The largest LE after all loss prevention risk improvements have been completed. Depending on the risk improvements made at the time of survey this will typically be less than the EML, but could potentially still equal the CNLE and/or EML

A fire originating anywhere in the building would be detected and controlled by the automatic sprinkler system. The fire would be completely extinguished by the local fire brigade upon arrival. Peripheral heat and water damage would occur with varying amounts of smoke damage.

RISK INFORMATION

Site Occupancy

This facility houses a university of applied studies with mainly theoretical studies. Some studies require workshops or laboratories. For the aeronautical study, composite materials are produced externally and assembled on this location using rather simple tools. A number of small 3D printers have been installed in this workshop. Two laboratories have been installed for the agricultural study. On the ground floor there is a limited sized laboratory where testing of food is conducted. On the 4th storey floor there is a chemical laboratory where flammable liquids are used.

There are 4 class rooms where computer equipment has been installed for educational purposes. No expensive equipment such as Apple computers has been installed.

The university provides education to some 600 students. A much smaller number of student is present on a daily basis. The university is open 5 days a week. This is a normal university occupancy with class rooms and offices spread throughout the building. The workshops are generally small and are spread over the building as well. There are some 5 workshops in the entire building.

On the ground floor there is a kitchen and associated restaurant. Cars are parked adjacent to the building. A limited number of cars can be parked underneath the building and underneath the timber skywalk adjacent to the building. The remaining area underneath the building is used for student bicycle parking purposes. In the basement there are a number of cut off rooms that house technical installations, some storage rooms and a technical workshop.

Occupancy Fire Load

The fire load is low up to moderate throughout. Reportedly the floor covering throughout has been provided with a fire retardant agent. The fire load in storage areas in the basement of the building is somewhat increased. These storage areas have been installed in cut off rooms.

Compartmentation

The staircases have been installed in a concrete cut off core. The adjacent elevators have been installed in concrete and fire resistive glass panel partitions. Openings are protected by fire doors which are activated upon a fire alarm. This alarm is generated by fire detectors that have been installed at either side of the doors or by the sprinkler system. A fire alarm would close all the fire doors in the building. The fire compartments are considered adequate and have a 60 minute fire rating.

No fire resistive glazing has been installed in the walls. A fire originating in a parked car could ignite the timber skywalk and could subsequently spread into the building.

Construction

Building Name	Main Occupancy	Year Built	Construction Information			Overall Classification Summary	% Sprinklers Adequate	% Sprinklers Deficient	Storeys	Ground Floor Area (m ²)	Total Building Area (m ²)	Estimated Property Value Split (%)
			Roof	Walls	Insulation							
Entire Building	Office	2008	Combustible	Light Non-combustible	Cellular plastic - non-approved	Combustible	95	1	6	1,500	12,000	100

Construction Definition	% of Total Building Area
Combustible	100

The building consists of a basement, a parking area partly in the yard and partly underneath the building and storey floors with various heights and with various roof levels. There are roofs at the 2nd, 3rd and 6th floor. There are various lofty rooms and a single atrium area (reception and kitchen/restaurant hall) from the ground floor up to the 6th level top floor. Three elevators have been installed.

The building is transparent throughout and partition walls generally consists of non fire resistive glazing. The building has an inner fire resistive load bearing structure. Overhanging building parts are supported outside the building by steel concrete filled load bearing columns. The walls consist of non fire resistive glazing throughout. The roof consists of concrete panels and combustible polystyrene insulation material.

There are concrete storey floors throughout.

Adjacent to the North side of the building there is an open steel skywalk that has been provided with timber flooring.

The atrium consists of two large glass panel walls whereas the construction of the walls in 2008 represented a world premiere of this prototype wall structure.

Special Hazards

Summary Table

Special Hazard	Arrangement, management and protection	
	#ADEQUATE	#INADEQUATE
Entire Building		
Commercial Kitchen	1	0
Flammable Liquid Operations	1	0

Process hazards are confined to small scale storage areas, a kitchen and associated restaurant, several workshops and two laboratories where limited quantities of flammable liquids are used. The kitchen has been provided with a deep fat fry system.

Utilities Infrastructure

Electricity and Lightning

Electrical power is supplied by the public grid. It is stepped down on site by a single transformer that has been installed in a concrete vault. The transformer is owned and maintained by the public electricity board. No further technical details are known.

Heating and Cooling

The air ventilation systems have been provided with cooling equipment. This equipment has been installed on roof level adjacent to the air ventilation system on the 6th storey floor. A non combustible refrigerant is used as primary cooling agent and water as a secondary cooling agent. Air is subsequently cooled by a heat exchanger.

The building has been provided with a municipal hot water system. Warm water is supplied to the building by a fixed underground water main. This presents a negligible exposure. Surplus heating is provided by a gas fired power unit (WKK). This unit has been installed in the yard and gas is supplied by a fixed piping system.

Gases and Liquids

Natural gas is used for the kitchen and the gas fired power unit.

Other

In total there are 4 air ventilation systems. They are located on the roofs on the 6th storey floor, on the 4th storey floor and in the basement. Each system serves a dedicated part of the building. The air inlet and air outlet ducts of the systems on roof level are located relatively close to each other. The air inlet and air outlet ducts of the system in the basement are located at a safe mutual distance.

Arson Exposure

Underground waste containers have been installed in the yard. No combustible materials are stored in the yard.

External Exposures

A power station has been built at a distance of 10 m from the building. A student apartment building has been built at a distance of 20 m from the building. Both buildings are included in the EML Block.

Human Element and Maintenance Control Programs

Electrical Maintenance

There is a rolling program of fixed electrical inspections in line with the Dutch Standard NEN3140, with one third of the installation inspected each year. On top of this frequency the entire installation is inspected every five years. Thermographic inspections are included.

General Maintenance

There is an on-site technical employee who performs small scale maintenance work. Specialised maintenance work is outsourced to the main contractor named Breijer and subsequently to a number of sub-contractors. A preventive maintenance program is in place which is regularly discussed with the main contractor and the technical manager.

Permits to Work including Hot Work Controls

The facility does not operate a formal permit to work system for the activities on site. The frequency of non-routine activities at the facility is considered to be low.

Contractor Controls

A formal contractor management policy is in effect at this facility. The same main contractor and sub-contractors are used to perform maintenance work. Maintenance work is by appointment only. Contractors are required to register themselves at the reception desk. Written safety instructions are handed out at all times at the reception desk.

Housekeeping and Loss Control Self-inspection

Generally, an adequate program is in place with good standards maintained across the entire site. Some areas need improvement. Risk improvements were submitted to support this.

Non-formal self-inspection rounds are conducted by the technical manager every two weeks.

Waste is stored in underground containers waiting for dispatch.

Control of External Exposures

Outside areas are regularly visited. There are no combustible materials stored in the yard.

Management of Change

All major projects are discussed with the technical manager. There is referral to local authorities but not necessarily to insurers.

Smoking Controls

Smoking is prohibited inside the building. Smoking is allowed around the building. Although there is no hazardous situation, a large number of cigarette butts were found in the yard.

Process Hazard Controls

Plant and Equipment Installations

All equipment is installed to a good standard in line with local code and best practice at the time of installation.

Testing of food for the agricultural study is done using small electrical cooking devices. The situation is acceptable. Generally there are no hazardous activities in the workshops.

Instrumentation and Controls

The natural gas supply to the kitchen and the exhaustion system is interlocked. A deep fat fry system has been installed in the kitchen. This system is protected by the sprinkler system. Sprinkler heads have been installed underneath the hood.

The building has been provided with an automated building management system. The air ventilation systems, the lighting system and electrical power supply is monitored by this system. Technical alarms are signalled to a constantly manned alarm station.

Safe Shutdown Systems

The gas supply of the laboratories are interlocked with a fire alarm. It is not known whether the gas supply of the power unit in the yard is interlocked as well. This is acceptable as the unit is located at a safe distance from the building.

Maintenance and Management

The atrium consists of two large glass panel walls whereas the construction of the walls in 2008 represented a world premiere of this prototype wall structure. The steel cables supporting the entire wall structure are annually inspected. The fixation of the wall with the concrete supporting structure is not inspected. A risk improvement has been submitted to include this fixation in the existing preventive maintenance program. Wind storm could result in a large damage.

Hazardous Goods and Spillage Response

The chemical laboratory use flammable liquids. Only small quantities of flammables are used in these laboratories. Adequate safety cabinets have been installed for the storage of chemicals.

Operator Training

There are no specific requirements relating to this occupancy.

Location and Construction

Vertical cable shaft are vertically cut off from the remainder. The concrete horizontal separation floors on each storey floor have been sealed. However, some deficiencies were noticed. No risk improvement has been submitted due to the fact that the vertical separation is considered adequate. The shafts have not been provided with fire protection systems. A fire could be unnoticed for quite some time. Cables through walls have been sealed adequately throughout.

The air ventilation ducts through fire resistive partition walls have been provided with fire dampers. These dampers are automatically activated by the building management system upon a fire alarm.

Technical rooms as well as storage rooms have been installed in adequate cut off rooms.

Extraction Systems

In the event of a fire the air ventilation systems are automatically switched to full load upon activation of the sprinkler system. This is a requirement of the local fire brigade. It cannot be excluded that smoke and soot is distributed throughout the building in the event of a fire.

The kitchen on the ground floor has been provided with an exhaustion system. The filters are regularly cleaned by the kitchen personnel while the exhaustion duct is annually inspected by a specialised company. Cleaning is performed at least every 5 years or if necessary as a result of the annual inspection.

Electrical Installations

All electrical equipment has been installed in line with the Dutch standard NEN1010. All cables run in suitable loaded cable trays. There is no redundant cabling. The transformer and switchboard are well arranged. The equipment is visually in a good condition.

Response Factors

Security and Access Control

Visitors and contractors are required to register themselves at the reception desk. However, this university building is open to the public and therefore easily accessible. Personnel access within the facility is controlled by individually programmed access cards.

Automatic Fire Detection

Smoke detectors have been installed at either side of the fire doors. The fire doors are activated by this system. It is not known whether the smoke detectors generate an external alarm.

Water Supplies for Manual Fire Fighting

Extinguishing water can be obtained from the underground public hydrants which are situated along the public roads. The hydrants are connected to the public water main. It is not known whether the public water main is maintained. The pressure and flow characteristics of the hydrants are unknown.

An unlimited supply of extinguishing water can be obtained from the nearby canal at a distance of 75 meters from the premises.

Public Fire Brigade

The public fire brigade has a response time of less than 10 minutes. No regular familiarisation visits to the facility are completed by the fire brigade.

Dry risers have been installed in all staircases on all storey floors. A hose connected has been installed outside the building at a safe place.

Incident Response and Shutdown of Supplies

Evacuation drills are held on an annual basis. The site has an incipient emergency response team as part of Dutch legislative requirements, consisting of 12 employees. The team is trained to deal with fires using portable fire extinguishers and hose reels. The team receives annual and well organized training. The primary purpose of this team is evacuation and life safety.

Fire Extinguishing Appliances

Suitable portable fire extinguishers and hose reels are provided throughout the site, which are serviced annually by a specialised contractor.

Fire Systems Maintenance and Impairment Management

The technical manager and the local management are notified in the event of system impairments. Sprinkler maintenance and impairments are planned during holiday periods. No hot work is allowed during system impairments.

The sprinkler system is the subject of 6 monthly checks. Several minor deficiencies resulted that no certificate was issued after the last inspection. These deficiencies are completed and Mr. Ruijsenaars is confident that the certificate will be re-issued. We noticed that storage heights are not respected in storage areas in the basement. Maintenance by the installer of the system is carried out every 12 months. The sprinkler pump is tested every two weeks by the main contractor.

Fire Protection Systems

Automatic Sprinkler Protection

A summary of building protection systems are listed below:

System Name / No.	Protected Area	Design Code	System Type	Design (est.) (mm/min, m ²)	No. of Sprinkler Heads / Min pressure (bar)	Sprinkler Heads (°C/K-Factor)	Available flow / pressure (lpm@bar)	Design flow / pressure (lpm@bar)	Required Design (mm/min, m2 OR No. / bar)	Available Design (mm/min, m ² OR No. / bar)	Adequate Per Code
Entire Building											
1	Entire Building	VAS	Wet - CMSA	5 mm/min@216 m2							Yes

With the exception of the outside area underneath the building, the staircases and elevator shafts, the cable shafts and a single storage area in the basement of the building the entire building has been provided with an adequate concealed automatic sprinkler system.

Sprinkler alarm is directly transmitted to the alarm station of the fire brigade.

Fire Water Supplies

Supply ID	System(s) Supplied	Supply Type	Design Code	100% Rating			Suction Source	Cut-in / Cut-out (bar)		Adequate per Code
				(lpm)	(bar)	(rpm)		Start	Stop	
1	1	Pump - Electric	VAS	2400	4.0	2900	Underground Reservoir	5.0	N/A	Yes

The system consists of a single electrically driven fire pump (design capacity: 144 m3/hr, 4 bar). A jockey pump has been installed to maintain pressure on the system. Water is taken from an underground concrete reservoir.

There is no emergency generator. A fire whereby the power supply would be cut off would result in a total loss. The power cable of the electrical pump runs from underneath the building directly into the sprinkler pump house in the basement. The exposed cable is rather short. A risk improvement has not been submitted due the values at risk.

Test Results

Test Date	Supply ID	Flow (lpm)	Pump RPM	Churn / Static Pressure (bar)	Pump Suction Pressure (bar)	Discharge / Residual Pressure (bar)	Pump Net Pressure (bar)	Pump Adjusted Flow (lpm)	Pump Adjusted Net Pressure (bar)
10/03/2017	1	0	2900		0.2	5.5	5.3	0.0	5.3
10/03/2017	1	1100	2900		0.1	5.3	5.2	1100.0	5.2
10/03/2017	1	1350	2900		0.1	5.1	5.0	1350.0	5.0
10/03/2017	1	2524	2900		0.1	4.0	3.9	2524.0	3.9
10/03/2017	1	3000	2900		0.0	3.3	3.3	3000.0	3.3

Water Storage

Water Storage ID	Type	Capacity (litres)	Height/Lift (+) or (-) (m)	Freeze Protection	Filled (method)
1	Concrete Underground Reservoir	172000	0	2 degrees Celsius	Automatic Suppletion

Fire Suppression System(s)

There are no fire suppression systems.

Business Interruption Information

In the event of a large catastrophe, the activities could be outsourced to other Inholland universities in the Netherlands or to a number of third party buildings. The majority of the activities are rather simple and no special building requirements are needed to outsource the processes. The rebuilding time is estimated at 24 months.

Contingency Plans

There are no business interruption contingency plans.

Natural Catastrophe Exposures

Earthquake/Volcano

This site is located in a hazard zone 0 (Munich Re rating system where 0 represents a low hazard and 4 a high hazard).

Hurricane/Cyclone/Tornado

This site is located in a tornado hazard zone 3 (Munich Re rating system where 1 represents a low hazard and 4 a high hazard). According to the Munich Re rating there is no Tropical Cyclone & Hurricane hazard.

Winter Storm

This site is located in a hazard zone 3 (Munich Re rating system where 0 represents a low hazard and 4 a high hazard).

The site is located in a moderate hazard zone. There is a high susceptibility towards damage. Combined, the windstorm hazard is rated high.

Flood (River, Coastal, Surface Water)

General

Approximately one third of the Netherlands is built below the mean sea level. These areas are subdivided into 53 main dike rings and approximately 40 small dikes rings. The latter dike rings are situated along the river Maas in the south of the Netherlands. Dike rings are exposed to the sea, to rivers or both to the sea and rivers. All dikes rings are surrounded by either dunes and dikes or levees along the rivers. Government experts have calculated the probability of a dike failure and flooding of the specific dike ring.

Dike ring #14

This site is exposed to the sea and rivers. The premises are exposed to the North sea, Nieuwe Maas and Nieuwe waterweg. This site is located in dike ring #14 named 'Zuid-Holland'. The government data shows the probability of a flood of this site as one in 2500 every year. The total surface area of this dike ring amounts to 2,226 km². The total length of the dike ring amounts to 236 km. The governmental rating of this dike ring is qualified as good and partly not determined. This dike ring has been subdivided in smaller areas by non classified dikes. The distance to the nearest classified dike ring is 12 km.

Sea

The site elevation is equal to the sea level. The site elevation is equal to the expected sea flood level. The site would probably not be flooded in case of a breakthrough of a sea dune or a sea dike.

River

According to Dutch government data a river dike breakthrough would result in an inundation depth of 1 m. The entire basement would be flooded. This is a rough estimate. As mentioned above the probability of a flood is one in 2500 every year. This is considered a normal risk.

Non classified bodies of water

Besides the risk of inundation from the sea and major rivers, the premises could always be flooded from non-classified ditches, rivers, canals etc. There are no inundation data for these bodies of water. The nearest non classified body of water is located at 75 m from the premises.

The site is located in a low hazard return period. There is a low susceptibility towards damage. Combined, the flood hazard is rated negligible.

Lightning/Hail

This site is located in a lightning and hail hazard zone 2 (Munich Re rating system where 1 represents a low hazard and 6 a high hazard).

Snow/Collapse

No excessive snow fall is expected in this part of the Netherlands. The roofs are regularly inspected by a specialised company.

Other Natural Catastrophe

N/A

OTHER CLASSES: COMMENTS

Crime

General Description

Generally rather inexpensive goods are present in the building. Computer equipment represent a slightly higher theft demand. There are 4 large touch screen monitors with an estimated value of 10,000 euro each. These monitors are considered to be of high theft demand. Related to the portability, the risk of theft is considered medium.

Physical Security

There are no physical barriers. The yard is not fenced in and the building is easily accessible.

Intruder Alarms

The windows on the ground floor have partly been provided with vibration detectors. Furthermore the entire ground floor and areas around the staircases and elevators have been provided with passive infrared intrusion detectors. Alarm is transmitted to a permanently manned central alarm station. The alarm station will alert a private security company. The watchman would go to the facility in order to verify the alarm and call out the police.

Other Security

The site has several internal and external CCTV cameras. The CCTV system covers the entire site. The camera footage is recorded and monitored at the reception desk during working hours. The value of the system after working hours is limited to police investigation purposes after an incident.

M&E

A machinery breakdown assessment was not undertaken, as this is only a university occupancy. As such, no major machinery is present.

APPENDIX

Site Plans and Photographs



Fire Resistive Wall



Non cut off Class Room



Housekeeping Sprinkler Room



Car and bicycle parking in Basement



Large glass panels atrium



Timber skywalk (left) adjacent to building (right)