

Luchtverkeersleiding Nederland (Lvnl)
Schiphol, Netherlands

Risk Engineering Report



Risk Engineering Services

Risk Engineering Report

Client

Luchtverkeersleiding Nederland (LvnI)

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Date of visit

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General information

Assessment scope

This assessment is based upon visit of the location and (verified) information provided during the building phase of the new extension.

Participants

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Han Dieben; Senior Risk Engineer, Swiss Re Corporate Solutions

Location assessment overview

Location overview and risk assessment summary

This is the main location of Luchtverkeersleiding Nederland. It includes the main hardware and operations as well as head-quarters.

Currently, it is located in one interconnected building block: all non-combustible construction; partially fire resistive. The building block has multiple internal fire separations, based upon the Dutch building codes, so 30 -60 minutes rated. There are no "absolute" fire separations though.

Fire protection has been provided by automatic sprinklers (70% - not the detached building) and partial automatic fire detection.

A new building "Polaris" has been erected over the past years, at some 50 meters distance of the other buildings.

There is a connection with an overhead corridor, crossing the public road below.

It will be used as training centre and as a back-up for operations.

The building construction is regarded non-combustible. Regarding operations/utilities, there is extensive redundancy. All with the aim to facilitate interruption free operations.

Fire protection by watermist (general) and gaseous extinguishing systems (hardware room).

Although most equipment and content is present, it will not be taken into full use before 2023. The time in between will be used for testing, commissioning and training.

Currently, the fall-back location at Riekerpolder is still available.

Hazards have been well taken care for, from a property point of view.

The main recommendation regarding the fire protection of the existing hardware room has been implemented.

Direct exposures are regarded medium only. Note however, that the location is just outside the airport.

Natural Hazard exposure is an issue related to flood, but adequate protection has been provided on governmental behalf.

Special hazards

Hazards relate to the operations, so are largely determined by the offices, traffic control operation rooms and the hardware room for supporting equipment.

Related to the latter there are generators on site to provide power in case of break-down of the public grid.

Next to the above, there are some special hazards:

- Storage of equipment (dedicated room);
- Workshops for development of equipment/ workspaces;
- Testing rooms for new equipment (servers-computer hardware).

Strengths

The site benefits from:

- Full coverage automatic fire protection, with exception of the detached parking/office building;
- Automatic smoke detection (spot type -high sensitive), in all general areas, areas with increased fire hazards, rooms with critical equipment.
- All non-combustible building with partly concrete load bearing constructions.
- Many (light) fire resistive separations.
- Management well aware of the exposures, and willing to invest.
- 24/7 Guards on site.
- Back-up for operations located elsewhere in the region.

Opportunities for improvement

Weak points are:

- Pre-action sprinkler protection in the current main hardware room (recently enhanced with aspiration smoke detection for pre-alarm).
- Workshops and storage in the same building as main operations (although sprinkler protected). Note that the workshops with hazardous processes (woodworking, welding, paint spraying) have been moved to a location elsewhere.
- Overhead corridor between existing and new building includes some combustible insulation materials.

Loss history

See overview:

- 2015, Location Eelde: fire, smoke soot: equipment lost. Some 72K, including costs.
- 2016, Schiphol - Oost: water damage. No values mentioned. Below deductible.

New projects

Polaris building (ongoing):

Completion, commissioning, testing and training.

Existing building:

Renovation of the equipment of the hardware room (when Polaris is operational).

Service comments

Project review and support were the main driver for our services. This will be limited as Polaris building is almost completed.

For the next period, it is expected that the services will concentrate on (re-) survey of Schiphol-Oost and surveys regarding the LVNL operations at three other airfields.

Changes since last visit

Construction of the new "Polaris" building.

Site description

At the location visited, Stationsplein Zuid-West 1001, Schiphol-Oost, there are:

Existing building:

Large rooms occupied with traffic controllers, supported by EDP and communications equipment.

A central hardware room for information exchange, planning and communications equipment for all locations.

Training facilities including a (traffic control) simulator.

Headquarters with board, administration.

Technical department with workshops, testing facilities and storage of spare parts.

Related utilities: electricity, cooling and data connections.

Polaris building (to be taken into use):

Hardware room for information exchange, planning and communications equipment for all locations.

Training facilities.

Related utilities: electricity, cooling and data connections.

Values and loss estimates

Sum Insured (SI)

Sum Insured - Values in EUR

	Building*	Machinery*	Stock*	Other*	Annual BI
Business Interruption	0	0	0	0	167,500,000
Reconstruction costs	0	0	0	10,000,000	0
Buildings A-C	181,578,125	96,382,380	0	0	0
Building D	40,558,678	20,000,000	0	0	0
Sub Totals	222,136,803	116,382,380	0	10,000,000	167,500,000
Totals		PD*	348,519,183	BI	167,500,000

Note: Total Property Damage (PD) value is comprised of Building and Contents values. Included in Contents value are the values of Stock, Machinery and Other.

Comments

General values taken from the SOV "LVNL 636189500 AH 3 specificatie per 31 december 2", received January 2021.

The Business Interruption figure shown is the *annual* amount, for all locations. The indemnity period being 104 weeks, the sum insured for business interruption is 335 million Euro.

The basic PD values are taken from valuation reports:

- Buildings: Troostwijk, December 17, 2015;
- Inventory: Troostwijk, September 7, 2015.

PD-Values include VAT, which can not be "cleared" due to the nature of the entity.

Maximum Possible Loss (MPL)

Definition

The "Maximum Possible Loss" (MPL) is that which may occur when the most unfavourable circumstances being more or less exceptionally combined, the fire is only stopped by impassable obstacles or lack of substance.

An "impassable obstacle" is considered to be any space between buildings and/or any obstacle which makes all propagation of fire (or the shock wave) impossible.

The above mentioned definition of MPL applies to perils such as fire and explosion. It does not apply to terrorist attacks or arson. In terms of perils such as natural catastrophes, insurers must include in their estimation the concept of accumulated risks.

Maximum Possible Loss (MPL)

MPL - Values in EUR

	Building	Machinery	Stock	Other	BI
Business Interruption	0 0%	0 0%	0 0%	0 0%	251,250,000 150%
Reconstruction costs	10,000,000 100%	0 0%	0 0%	0 0%	0 0%
Buildings A-C	103,180,000 70%	96,382,380 100%	0 0%	0 0%	0 0%
Building D	28,391,075 70%	20,000,000 100%	0 0%	0 0%	0 0%
Sub Totals	141,571,075 64%	116,382,380 100%	0 0%	0 0%	251,250,000 150%
Totals		PD	257,953,455 74%	BI	251,250,000 150%
Extra Expense					0
Interdependent Business Interruption					0
Total LE					509,203,455 99%

Comments

Under MPL conditions, this location is considered to be one fire area, due to the absence of "absolute" fire stops. With all fire protection impaired and no adequate response by either personnel or fire brigade, all buildings and equipment will be heavily effected by the fire. It will include building D, due to the corridor connecting both building blocks. According to SwissRe guidelines equipment will be lost for almost 100%. Buildings will have some salvage potential due to their non-combustibility, structure (partially fire resistive), and generally low-medium fire load. Reconstruction costs will be needed to their full insured value.

Regarding business interruption: all operations will shut down in this scenario, as equipment supporting all critical operational systems are located in the centrally located hardware room in buildings A-B.

Rebuilding that room will take over a year. Note that some of these systems are old and spares are not easily obtained. Strict requirements from authorities apply. Expect 1,5 year to rebuild and for commissioning, so MPL BI amounts 150% of the *annual* figure (2 years' amount insured - see insured value).

As per Swiss Re definitions for MPL estimation, leeway to the back-up location at Rieker polder is not taken into account for this scenario.

See definition of Maximum Possible Loss.

Note that under "normal conditions" the back-up at Riekerpolder is reported to be able to absorb some 50-60% of operations at full capacity. There will be some extra costs involved.

Current Normal Loss Potential (CNLP)

Definition

The Current Normal Loss Potential (CNLP) reflects largest monetary loss as a result of an event scenario, generally associated with a single fire, or explosion, taking into account *all* factors that attribute or lessen the loss. Among others, factors include, but are not limited to: lay-out of the site, neighbouring premises, occupancy, fire load, building construction and materials, human response, automatic and manual protection, smoke detection, etc. -all as present in observed quality at the time of the assessment/survey.

Current Normal Loss Potential

Current Normal Loss Potential - Values in EUR

	Building	Machinery	Stock	Other	BI
Business Interruption	0 0%	0 0%	0 0%	0 0%	8,375,000 5%
Reconstruction costs	0 0%	0 0%	0 0%	5,000,000 50%	0 0%
Buildings A-C	9,078,906 5%	15,000,000 16%	0 0%	0 0%	0 0%
Building D	0 0%	0 0%	0 0%	0 0%	0 0%
Sub Totals	9,078,906 4%	15,000,000 13%	0 0%	5,000,000 50%	8,375,000 5%
Totals		PD	29,078,906 8%	BI	8,375,000 5%
Extra Expense					0
Interdependent Business Interruption					0
Total LE					37,453,906 7%

Comments

Under CNLP conditions, a fire starts in the hardware room in building A/B. It will probably be detected by the automatic smoke detection (aspiration type) which is installed above inlets of the air conditioning units (CRACS). Follow-up will be done by the emergency team. This team has no breathing protection, so it all depends on the stage in which the fire is, whether there can be adequate manual intervention. The Schiphol fire brigade will provide support after some 5-10 minutes. In case it "gets out of hand", the preaction sprinkler system can be activated manually.

Expect some thermal damage, locally. However extensive smoke and soot damage, requiring extensive clean-up, and a prolonged period for testing and commissioning. Note that strict rules of the aviation sector apply. The valuation report states 49.5 million for computer equipment and systems. With index figure 121.6 (see SOV) that results in 60 million at stake. Take 25% for material damage: 15 million. 4 months for repair, testing and commissioning.

During repair, the hardware room will not be available to support operations.

Operations can be taken over by the back-up location at Riekerpolder. Ramping-up to full capacity requires a few days maximum.

Riekerpolder, under normal circumstances is able to handle 50-60% of LVNLs' full capacity. Due to the Covid pandemic, there still is much less air traffic. Currently one expects that all operations can be covered by the Riekerpolder location. Extra costs will be involved.

Note the above scenario states repair of the current hardware in the hardware room of building B. It is already planned to replace this hardware within the next 3 years.

One could also decide to refrain from repair of the old equipment and to speed-up the completion, testing and commissioning of the new hardware in building D. Note 90% of that equipment is already in place.

All depending on the extend of the damage.

Detailed risk assessment

Exposure elements

Assessment of Exposure Elements

External perils

External perils

The site is located directly outside of the Schiphol-airport fences.
Building C is connected to the Steigenberger Hotel by a parking garage.
Public roads at three sites of the building.
Ringvaart (Ring canal Haarlemmermeer polder) across the street. Vessels of all kinds.

Process hazards

Activity

Luchtverkeersleiding Nederland ("LVNL" Air Traffic Control, The Netherlands), handles all civil air traffic above the Dutch territory below 24.500 feet.

The largest location is at Schiphol-Oost, with the centrally located operations room (air traffic controllers) and hardware.

LVNL is furthermore located at four civil airfields in the Netherlands for "Approach", "Start/Landing" and "Platform" operations (all below 10.500 feet).

Supporting equipment (beacons, radar facilities, communications equipment etc.) is scattered all over the Netherlands.

Air traffic above 24.500 feet is handled by Eurocontrol.

The main locations of LVNL are:

- Airportplein 59, Rotterdam (Airport Rotterdam - the Hague);
- Vliegveldweg 17, Beek (Airport Maastricht-Aachen);
- Machlaan 16a, Eelde (Groningen Airport);
- Airport Lelystad;
- Control towers at Schiphol (Airport Schiphol);
- Stationsplein Zuid-West 1001, Schiphol-Oost.

The survey concentrated on the latter. This location houses air traffic control activities: main operations room and related hardware and utilities.

Recently, the military air traffic control has been moved to this location also.

Furthermore: head-quarters, testing (computer equipment), workshops (no wood working/paint spraying) and storage rooms for equipment and consumables.

In total some 500 people are employed at Schiphol-Oost. The location is occupied 24/7.

Business interruption

Critical equipment

At present, with the "Polaris"- building not operational:

Key equipment of the main tools (Rad-Net, Garex, Triple A) is concentrated in the central hardware room (building B). There is redundancy, however all located in the same room. Special requirements (ICAO) apply for approval and reliability.

These systems will be replaced, when the equipment in the MER of Polaris building is fully operational, tested, commissioned.

Polaris (D) will then act as a back-up of the hardware room in building B. Polaris also includes a back-up for the operations room for the air traffic controllers.

Furthermore there is critical equipment at several airfields, however at a much smaller extend.

Utilities/service interruption

Utilities (power, cooling, data) are provided with sufficient redundancy and well spread over the building. Conditions are permanently monitored. Trips generate alarms that are transmitted to personnel (24/7). In the "old" building, there are three emergency power units: 2 "standard" and one "dynamic" (DRUPS). The standard EPU's are tested on a weekly basis.

The power, data and cooling of the Polaris building is fully independent from the "old" buildings. Within Polaris building, full power redundancy is available, by two independent feeds (A and B side), each having their own transformers, DRUPS (Hitec Power pro 1250kVA), emergency power etc. Complimented by ready connections for external EPU's.

Interdependency and contingent BI

All LVNL operations depend from this locations' operations (personnel) and hardware room. A back-up location (Riekerpolder) has been arranged, capable of taking over 50-60% of the maximum capacity. At present, with current decreased operations (Covid), it will be able to handle almost all.

LVNL has a well established contingency and crisis management organisation. Related to the strategic importance of the site for all air traffic in the territory of the Netherlands, full support is to be expected from the authorities at National level.

Protection elements

Assessment of Protection Elements

External Perils

External Perils

Office type activities and equipment: medium exposure to burglary and theft.
Political violence can not be excluded related to activities of LVNL.
LVNL maintains close contact with authorities and response agencies.

There is a porters lodge at the main entrance. Guards are on site 24/7.
Strict access control. Extensive electronic measures, such as cameras, intrusion detection.
The old buildings (A-C) are surrounded by water or fences.
The Polaris building (D), apart from the North-East side has not been fenced in.

Layout and construction

Within unit/building/structure layout and compartmentation

Buildings A,B, Atrium (A') and detached building C (office/parking - 18 meters distance):
Buildings are four storeys in height. Both blocks are interconnected by two overhead corridors, of non-combustible construction, and doors at both sides. The total built-up area amounts some 9.900 m². See aerial picture.
Within building block AB,A' there are multiple fire separations according to the Dutch Building legislations: 30-60' rated. Valuable in relation to (predominantly) low medium fire load and fire protection present.

Doors (in separations) are self-closing. Cable and other break troughs have been provided with adequate sealing and protection. All subject to a maintenance contract.
Utilities are located in dedicated rooms.

Overhead bridge (53 meters):

Connecting building A' (Atrium) with building D (Polaris).

There are fire resistive doors at both ends. Fire load is low in the corridor. In the outside wall some combustible insulation has been applied over the full length.

Building D (Polaris):

Many internal fire separations present. The vide is surrounded by walls, windows there-in are provided with fire resistive glass.

Utilities are located in brick/concrete rooms, well separated from each other and their surroundings.

Construction materials of supporting structures and walls

Buildings A, A', B, C:

All non-combustible construction and insulation materials.

The main load bearing constructions are made of steel and partially concrete. The roof above the operations room (B) is suspended from an external steel load bearing construction.

The atrium has a steel load bearing construction.

Floors all are concrete made.

Corridor:

The corridor has a steel frame load bearing construction, supported by a concrete pylone at some 25% of the distance and both the buildings.

It has an outer shell of aluminum and glass. The insulation is largely rock wool (165 mm), but between the aluminum and the rock wool there is a layer of polystyrene (28 mm).

Building D:

All non combustible load bearing constructions (largely steel) and walls. The walls are partially glass (offices), and partially solid brick/concrete (utilities, hardware rooms).

Roof construction and materials

Building A, A', B, C:

All non-combustible roofs: Largely concrete, partially steel. Rockwool insulation on top, covered with felt and pebbles.

Inherently, the atrium has a glass roof.

Building D:

Steel deck roof with FM approved insulation. TPO (no bitumen) capsheet.

The roof has been provided with solar panels.

Electrical installations, lighting fixtures and cabling

All electrical installations according to local standards. No special requirements (no dangerous environment).

Fire protection

Fire water supply

Water for manual fire fighting can be obtained from hydrants in the public road and nearby open water.

The hydrants are connected to the water-supply of Schiphol airport.

The sprinkler system is fed by two pumps:

- Electrical 66m³/h
- Diesel 81 m³/h.

Water source: underground basin (365 m³).

The hi-fog installation (building D) is fed from two tanks inside the building.

Fire brigade and public fire department

Private - professional fire brigade of Schiphol airport ("land side"-team). Back-up by the professional public fire brigade of Haarlemmermeer.

LVNL has an emergency response team. In total (spread over the shifts) some 75 employees are member.

Twice per year there are exercises with the public fire brigade.

Sprinkler installations in production/process area

Buildings A,A' and B have been provided with a sprinkler system throughout, including the atrium. All according to the VAS (Dutch Sprinkler guidelines) as relevant at the time of construction.

Density is 5mm/m² over 214 m².

In the hardware room it is a pre-action system. Water supply triggered by spot type smoke detection at the ceiling and below the floor.

The system is subject to the Dutch certification scheme (CCV) and inspected twice per year by inspection body "Veritas.

Latest inspection report : June 2021. Non approval (see recommendations).

Building D, has been provided with a hi-fog system throughout, with exception of the hardware room (MER). The hardware room has been provided with automatic gas extinguishing systems (ProInert = Argon/Nitrogen mixture). It is triggered by aspiration type smoke detection.

All based at NFPA guidelines.

UPD's and Inspection reports (latest 2020) in our file.

The corridor, connecting both building blocks, is included in the high fog system of building D.

Sprinkler installations in storage areas

See "sprinkler installations in production areas".

In the storage room, the racks have been provided with in-rack sprinklers.

Special protection measures

See sprinkler systems: the hardware room (building B) has been provided with a pre-action sprinkler system, with the waterflow triggered by spot type smoke detectors. Over the years the room has been equipped with local air treatment units (CRAC) which may interfere with the conventional smoke detection. As an upgrade additional aspiration type smoke detectors have been installed, which will alarm the emergency response team at an early stage.

In Building D, the hardware room has been provided with automatic gas extinguishing systems (Pro-Inert). It is triggered by aspiration type smoke detection.

Manual fire fighting measures

A sufficient amount of handheld extinguishers and hose reels.

Fire and smoke detection measures

Buildings A, A', B, C:

The buildings have been equipped with automatic smoke detection (spot type - high sensitive). It covers:

- All main areas, corridors etc.
- All technical rooms and rooms with critical equipment.
- Also located below the floor of the main hardware room.

Aspiration type smoke detection has been provided in the test areas for equipment and the hardware room.

According to NEN 2535. Inspected twice per year. Certified.

No detection in the atrium.

Building D:

Full coverage automatic smoke detection.

Aspiration type smoke detection in the hardware room.

Alarms are transmitted to the porters lodge and public fire brigade.

Operations, procedures and regulations

Permit to work

Strict procedures for work, including hot work apply.

Smoking regulation

Smoking is not allowed within the buildings.

Contractors management

Strict procedures apply. Especially in relation with any work that could influence the operations.

Risk management

Risk management philosophy

LVNL maintains a contingency and crisis management organisation aiming at non-disturbance of LVNLs' operations.

Threats are investigated, evaluated and, when deemed necessary, mitigated.

A HSE-coordinator has been appointed.

Regular self-audits and - inspections are carried out.

Commitment to safety

Housekeeping

Housekeeping is at a good level.

Process and equipment integrity

Maintenance

All equipment is subject to preventative maintenance.
Electrical installations are subject to inspections compliant to NEN 3140, including thermographic imaging.

Inspection and maintenance of fire fighting equipment

All fire fighting equipment is tested, maintained and inspected according to applicable guidelines. It includes weekly tests of the fire pumps by the ERT and an outside contractor.
Sprinkler and automatic fire detection systems are subject to third party auditing (Veritas), according to the Dutch CCV schemes.

Business interruption

Business continuity management

See risk management philosophy.
LVNL's income directly relates to the amount of "air movements" they handle. For Schiphol this adds up to some 500.000 per year.
The location visited, especially the hardware and operations room, are critical for all operations.

Georedundancy

Three main (and critical) systems are run from equipment in the hardware room. Redundancy is available (A+B set-up), however A+B sets are located in the same undivided hardware room.

External power (public) and data are supplied from two sides in separated parts of the building.

At the "Riekerpolder"-location, a back-up facility has been set up, which is on "cold stand-by". It is capable of maximum 50%-60% of the capacity at Schiphol-Oost. Designed to be operational within 4 hours. It will take however some time (a few weeks) to build up its capacity.

In 2023/2024, georedundancy will be provided through the facilities within the Polaris building.

Natural hazard elements

Assessment of Natural Hazards

River Flood

Medium

According to SwissRe Geo Portal, the site is located in a (river) flood zone with a return period of 50 years. The region has been protected on behalf of the Dutch authorities. All water bodies in this area, as in the rest of the Netherlands, are controlled. The LVNL grounds are located in the Haarlemmermeer polder. Directly adjacent to LVNL, there is the Ring dike, which defines the Ringvaart (canal) around the Haarlemmermeer polder. According to provincial data, this dike has been designed for 1/1 000 year failure.

Storm Surge incl. Coastal Flooding

Medium

Geoportal: without protection, the area would be subject to (coastal) storm surge with a return period of 50 years. For this region, protection has been provided on governmental behalf, which has been designed for 1/10.000 years high water level (Dyke ring protection).

Earthquake

Low

GeoPortal: Seismic hazard is very low.

Wind Storm

Medium High

As per GeoPortal, the 50 year Peak Gust is 40-50 m/s, which defines wind storm as a significant hazard.

Hail Storm

Low

GeoPortal: low hazard.

Lightning

Low

As per GeoPortal: Lighting hazard is rated "Low". Roof mounted solar panels and antennas add to the exposure. As per the sensitive operations/equipment, extensive lightning protection has been provided.

Risk improvement opportunities

The following Risk Improvements make no claim to completeness and they are not an identification of all the hazards and deficiencies that may exist. They are suggestions for risk improvement and for minimising potential losses that are based on brief general observations and discussions at the site. They are not the result of detailed engineering studies.

The insured remains fully responsible for compliance with all applicable laws and regulations. Please note all disclaimers and restrictions at the beginning of this report also apply to all Risk Improvements.

Should the insured, or its advisors, have alternative views on these Risk Improvements; Swiss Re Corporate Solutions will welcome the opportunity of further discussion.

Summary

Number		Status	Priority
2018-02-01	Fire protection main hardware room	Completed	
2018-02-02	New Building: "Annex".	Completed	
2021-08-01	Housekeeping DRUPS - No Break room, "old" building.	Agree: Progress Pending	Medium
2021-08-02	Sprinkler certification - non-approval	New/Under Review	Medium

Risk Improvements

2018-02-01	Fire protection main hardware room		
Priority:	High	Status:	Completed
Issue Date:	20 February 2018		
Category:	Protection	Subcategory:	Notification

The main hardware room is the technical heart of all air traffic operations and therefore critical to LVNL, Schiphol and even the Netherlands. The chance of a major loss in that area therefore has to be minimized.

One of the main threats is fire. For this reason the hardware room has been equipped with a pre-action (dry) sprinkler installation, triggered by automatic smoke detection.

However, due to the air treatment systems in this room, smoke may (will) be detected with delay or even do not reach the detectors. This will cause a delayed alarm and the sprinkler system will not provide protection as intended. Manual fire fighting may be very difficult in that situation.

As a result the hardware in the room may be heavily damaged, and operations have to be stopped.

For this reason it is strongly advised to improve the fire protection of the hardware room. In the light of the developments regarding the Annex building, which will result in a full back-up for the operations as this site, a total re-design of the fire protection is deemed not to be feasible.

But, for the intermediate period, - still 6 years - , the situation could be highly improved by "simple" measures. In the past it has been advised to install aspiration type smoke detection at the air treatment (CRAC) units. In that way smoke will be detected in its very early stages and simple manual intervention will be facilitated. We highly support that advise and ask you to reconsider this option.

Situation 2021:

The recommendation has been completed.

The CRAC units (6), each have been provided with aspiration type smoke detection (VESDA).

2018-02-02 New Building: "Annex".

Priority:	Medium	Status:	Completed
Issue Date:	20 February 2018		
Category:	Protection	Subcategory:	Others

The construction of the new building "Annex" has been started. When finished, this building will, apart from training facilities, provide full and independent back-up of LVNL's operations as present in the current building at Schiphol-Oost. This will be a big improvement related to business continuity preservation. Some important features (high level):

- All non-combustible, partially fire restive building;
- Several internal fire separations, including a 2 hour rated wall;
- 53 meters distance to existing building;
- Connected to existing building by an overhead bridge (discussion topic);
- General fire protection by full coverage water mist protection and automatic smoke detection;
- Central hardware room protected by an extinguishing system based upon inertising gas (presumably Inergen) and high sensitive aspiration type smoke detection;
- Full geographical redundancy of all utilities such as power, data and cooling;
- Equipment located above (water) threat level related to dyke failure.
- At the follow-up meeting March 6, the "Annex" has been discussed. Regarding:
 - *The "overhead bridge"*, Swiss Re Corso has stated that the design as sketched will not result in a "MPL-type" of separation for insurers' loss estimation purposes, as per SwissRe Corso Guidelines. (*See definitions*). This however does not pose a problem to SwissRe (all non combustible bridge, one hour rated doors and independent automatic fire extinguishing systems both sides). Willis Towers Watson will investigate the position of other insurers on the contract.
 - *General construction* features it has been emphasized and confirmed that these will all be non-combustible.
 - *Fire protection systems* of the "Annex" building: these will be "certified" according to the Dutch certification scheme. The related UPD's are in their draft stage and will be provided to Insurer (SwissRe - Han Dieben) and broker (Peter Bakker - Willis) for review.
 - *Cabling and wiring*: it has been discussed to utilize only "fire safe" and "halogen free" type. This has been confirmed.
 - *Actions*:
 1. Swiss Re Corso to provide contact details regarding data room protection/commissioning;
 2. Willis Towers Watson to confirm position of insurers regarding the "bridge" and insurers' market loss estimation.
 3. LVNL to provide design specs (UPD) regarding fire protection.

Situation 2021:

The new building, now called "Polaris", has been completed. The majority of equipment has been installed. Next period (> 1 year) will be used for commissioning, testing and training.

Technical requirements as described above, all have been met, apart from (part of the) the construction of the corridor. See report.

2021-08-01 Housekeeping DRUPS - No Break room, "old" building.

Priority:	Medium	Status:	Agree: Progress Pending
Issue Date:	19 August 2021		
Category:	Human Element	Subcategory:	Housekeeping

The housekeeping in the DRUPS- No break room needs improvement. Miscellaneous storage has been observed as well as a test situation with un-safe electrical connection.

Note that the sprinkler installation in this room has not been designed for control of areas with a lot of combustibles.

2021-08-02 Sprinkler certification - non-approval

Priority:	Medium	Status:	New/Under Review
Issue Date:	19 August 2021		
Category:	Protection	Subcategory:	Sprinklers - Production

The latest inspection report regarding the sprinkler system (Veritas - June 2021), states several issues, leading to "non-approval". As the sprinkler system is critical for fire protection, we do advise to solve these as soon as possible. Referring to table 2.3 of the inspection report, we conclude that the issues largely relate to storage arrangements and/or shielding of sprinkler heads. These can be met by organizational measures.

Tabel 2.3 – Afkeerpunt(en): waarneming dat afgeweken is van het normatief kader, waardoor de brandbeveiliging als niet doeltreffend wordt beoordeeld. Alleen een inspectie zonder afkeerpunten leidt tot een inspectiecertificaat	
Tabel 2.3 – Afkeerpunt(en):	
2002.02	Er is sprake van onbeschermde brandbare buitenopslag tegen de gevel in de courtyard (circa 15 m2).
2006.01	In testruimte B1.39 / B1.33 vormen een 2-tal kabelgoten vormen obstructie voor de sprinklers. Hierdoor zijn een 2-tal stroken vloeroppervlakte van circa 6 bij 2m onvoldoende beschermd. Als alternatief, het leeghouden van deze stroken van (tijdelijke en permanente) brandbare opslag en processen (computers e.d.), is hier niet toegepast.
2102.01	In ruimte B4.WA vormen luchtbehandeling kanalen een obstructie voor de sprinklerinstallatie. Onder deze kanalen is opslag geplaatst. Hierdoor zijn of obstructiesprinklers noodzakelijk of alle opslag onder kanalen breder dan 1 meter moet verwijderd worden (circa 5m2 opslag aanwezig).
2102.03	In archiefruimte A0.63 is geen 50 cm vrije ruimte tussen de sprinklers en de opslag aangehouden. Dit wordt veroorzaakt door dozen die bovenop de rolkasten staan (circa 4m2).
2106.01	In ruimte B4.WB vormen luchtbehandeling kanalen een obstructie voor de sprinklerinstallatie. Onder deze kanalen is opslag geplaatst. Hierdoor zijn of obstructiesprinklers noodzakelijk of alle opslag onder kanalen breder dan 1 meter moet verwijderd worden (circa 3 m2 opslag).
2106.02	De geïsoleerde leidingen aan het plafond van ruimte B4.WB vormen een samengestelde obstructie voor de bovenliggende 8 sprinklers (circa 2 x 30 m).

Appendix: documents received

Existing building (A-C):

- Reports smoke tests hardware room (regarding the aspiration smoke detection);
- Inspection reports "Veritas" regarding sprinkler system (June 2021), Automatic fire alarm (June 2021)

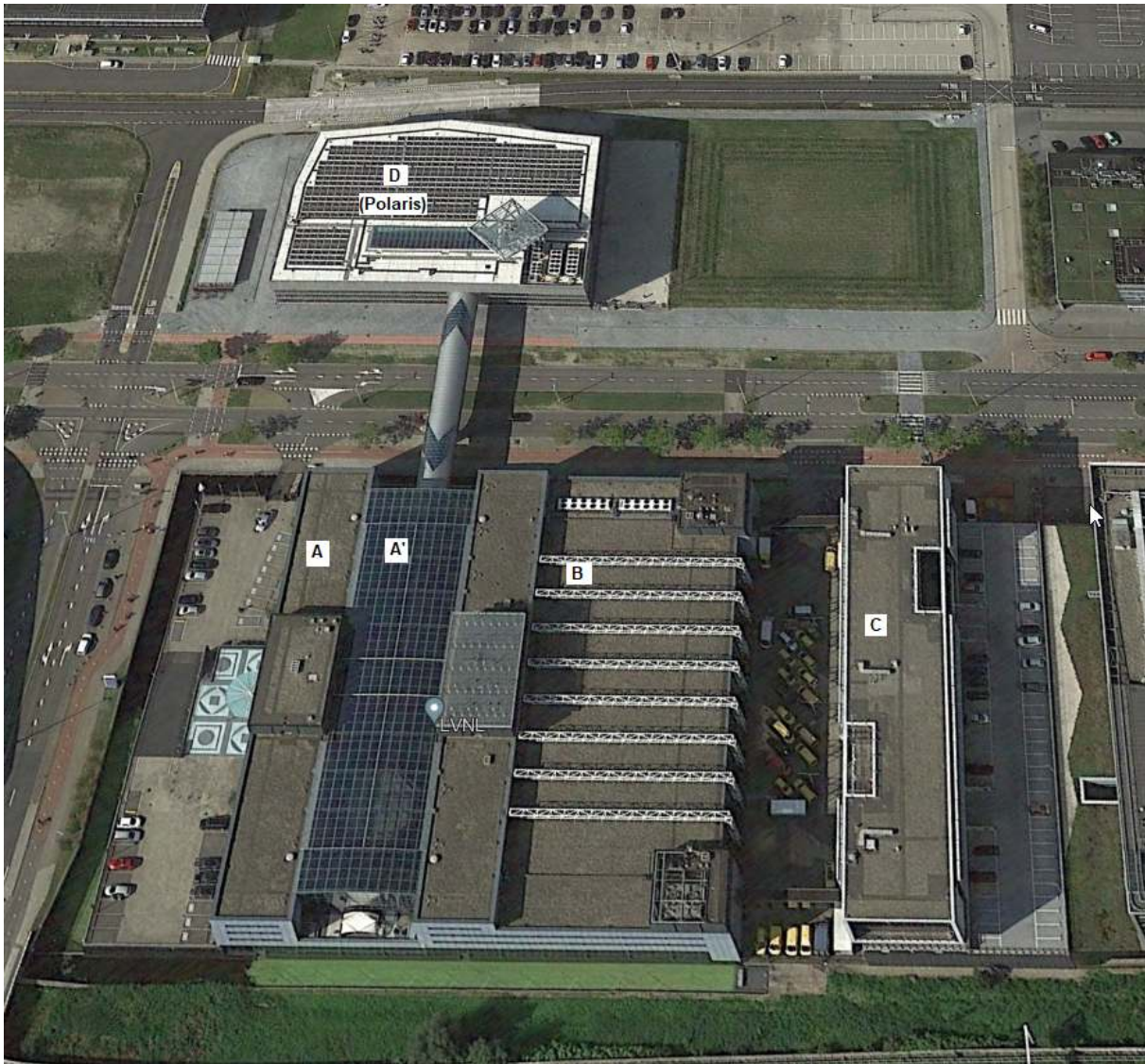
Polaris building (D):

- Inspection reports "Veritas" regarding automatic fire alarm, gaseous ext. system, watermist system (June 2020).

During the construction phase, a multitude of documents have been received:

- Construction specifications of the corridor;
- Construction specifications of the building;
- UPD + NVA regarding fire protection installations (watermist, fire detection, gaseous extinguishing systems);
- Reports smoke tests hardware room and operation room;
- Solar panels;
- Lightning protection.

Appendix: Images



Appendix: Risk improvement definitions

Risk improvement priority guide

Priority	Equivalent wording
High	These are high priority Risk Improvements that present a large property loss potential or major business interruption exposure in the event of a loss incident.
Medium	These are Risk Improvements that should be completed as they can result in a loss to property and/or business interruption.
Low	These are Risk Improvements identifying areas of sound loss prevention that can be completed on a programmed basis. Improvements are recognized as an enhancement to the overall quality of loss prevention at the facility.

Risk improvement status

Status	Equivalent wording
Completed	Action has been taken to address the Risk Improvement. Advice has been received on the outcome and completion date and this has been verified by the surveying engineer.
Completed - not confirmed	Action has been taken to address the Risk Improvement. Advice has been received on the outcome and completion date, yet this has not been verified.
Held in abeyance	Decision has been taken by the client to suspend Risk Improvement. Reasons for suspension have been provided.
Rejected	Decision has been taken by the client not to address the Risk Improvement. Reasons for rejection have been provided.
No Progress	No action has been taken on the Risk Improvement.
In progress	Action has been initiated to address the Risk Improvement. Update on the expected outcome has been provided.
Agree – progress pending	A plan to address the Risk Improvement has been agreed. Information concerning the expected outcome of the action have not yet been provided.
New/under review	Risk Improvement has been provided to the client and is currently under review.

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Swiss Re Corporate Solutions
Risk Engineering Services

Task ID
93701

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