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AUTOMATED WASTE & LAUNDRY COLLECTION SYSTEM (AWCS)

Ecosir Group Ltd. A Finnish Company with 35 years experience in Hospital Logistic Solutions, specialised in Automated / Pneumatic Waste Collection Systems and today has more than 100 systems in operation across the world. The cutting edge technology is used as a primary waste collection system in Hospitals, Residential and Industrial Kitchens worldwide. Ecosir is one of the inventors of the system as well as a long-term developer. The company holds several patents related to the system.

ECOSIR automatic transfer solution eliminates the possible risk factors conserning the soiled linen and waste by using a vacuum pipeline network.

The great benefit of this unique system is that the Hospitals where the system is installed, will reach a whole new level of hygiene. The waste and soiled linen is safely removed only in few seconds, from the wards in the Hospital through Drop&Go[™] points, ending to the containers outside the hospital. The system is fully sealed (all the waste, dirty laundry and dangerous bacteria will be in closed system from the ward to specially designed vacuum containers). The hygiene level of the Hospital will be in another level comparing to the Hospitals which are using the manual way (trollies) of collecting waste.

Study and the reference case:

Central Hospital in Finland:

The study was made in 2014 by the LAB University of Applied Sciences, one of the major Universities in Finland.



The Hospital was founded in 1955 and it is located in Finland. The number of the employed is 1250 and there are 340 hospital beds. The Hospital is covering an area with about 150 000 inhabitants.

Several fractions of waste are being collected in the Hospital. These fractions are instructed and controlled by Finnish Ministry of Health (MOH). The different fractions are Mixed Waste, Recycled Waste, Bio Waste, Electronics, Glass and Magazines.

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Before taking the automated vacuum waste and laundry transfer system in production, the Hospital had to organize all the material collection manually. This study is about how the Hospital survived with the growing amount of different fractions of waste and with the growing amount of soiled laundry. This Study is before the time the Hospital had the Automated Waste and Laundry Transport System (AWCS) installed and in production.

The deep Research about the Waste and Laundry streams was made already in 2014. Therefore this is not a new information and many actions have already been done in several countries by the local MOHs. Just recently the MOH in Singapore, Norway, Kuwait, Finland and Sweden have been using AWCS systems as a standard requirement. This system is to be adopted in all hospitals under construction especially in the Government Sector.

The Resource proved that there were several disadvantages in the old-fashioned way, the manual way of transporting waste and laundry by using the trolleys. One of the major problems was the hygienic issue. The waste was collected manually from wards. Before the collection the waste was kept in the corridors and in the patient rooms even for long periods. The study showed that the risk of infections was high in the old-fashioned process.

During the research a large amount of data was collected and hundreds of queries and interviews was made to outline the picture of the current situation at the Hospital Campus (2014). The Documentation was done also by using photography, of witch some pictures are shown here. (*NOTICE: after the AWC system installation all these problems has disappeared*).

The research examined the waste and laundry manual transport in general: the hygienic issues, working environment, accidents at work, safety risks while working.

Waste:

Yearly the Hospital was producing **316 tons** of mixed and energy waste. There were **56 210 pcs waste transfer actions** per year Average mixed waste bag 3.7 kg (The heaviest sack 7.1 kg, mixed waste) Average energy waste bag 2.4kg

Laundry / Linen:

588 tons of dirty laundry per year
The average weight of laundry bags is 7kg
The heaviest laundry bag is 14.8 kg
4745 pcs dirty laundry transfer actions per year
Laundry is often in the same trash room with the trash

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Picture: Previously the waste was kept for long periods at corridors. The corridors were often blocked with the waste and laundry trolleys.

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MAJOR HYGIENE PROBLEMS WERE FOUND:

The waste bag stands for a maximum of 12h 30 min and a minimum of 2h 50 min at wards

- Liquid sometimes leaks into the aisles
- Disturbing Odor nuisance
- High Risk of infection

Dirty laundry is collected only once a day, collected in the morning at 6-7, the maximum standing time is about 24 hours. Laundry is often in the same trash room with the trash.

ERGONOMICS / WASTE

LIFTING

• Typical working shift, the Hospital's Facility Manager counted 102 lifts per day

WALKING

- 9 694 steps per shift
- 48 470 steps per week, or 50 km



Picture: Pulling and pushing daily manually hundreds of trolleys from the Hospital wards is hard work. And very unhygienic process.

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ERGONOMICS / LAUNDRY

- Physically very demanding work
- Pulling big and heavy trolleys
- A full laundry trolley weight about 139 kg
- Sometimes the service people are moving three trolleys at the same time. This is a major risk for back, shoulders and knees.
- There are approximately 2 600 pcs laundry trolleys per year
- On average 8749 steps / shift, i.e. 5.51 km



Picture: The heaviest laundry bag was measured 14.8 kg. A full laundry trolley can weight 139 kg.

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WASTE AND LAUNDRY FLOWS / WHERE ARE THEY?

LIFTS - ELEVATORS

- The same elevators are shared for transporting waste, laundry, food and patients
- The Hospital needed to book own time for waste laundry transfer and lifts were blocked for others.
- This practice slowed down the hospital work and increased the risk of accidents

CORRIDORS

- Waste and laundry trollies are using the same corridors as the visitors, patients and staff
- Risk of collision, dodging and waiting





Picture: Hospital had to book special times to for waste and laundry use and block the other to use the elevators.

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ACCIDENTS AT WORK

- According to statistics, in 2013 there were 39 accidents at work related to laundry or waste handling.
- According to statistics, in 2013 there were 38 near-miss situations related to laundry or waste handling.

OCCUPATIONAL HEALTH & SAFETY RISKS

- Narrow corridors
- Narrow waste rooms
- Incorrectly sorted waste For example, needles among mixed waste



"I was pulling the trolley in the laundry service room, while my shoe got stuck to the trolley and I fell down on the floor"

-laundry service

"My finger was hit by a needle inside the garbage bag" -waste service

"Many have to go on sick leave because of neck-shoulder problems" -Hospital's facility manager

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Picture: The corridors are narrow for big laundry trolleys and the waste rooms can be very impractical. Not to forget sometimes very challenging ways to trash room or laundry service area.

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WELL-BEING AT WORK / WORK ATMOSPHERE

- Occupational health care costs are increasing
- Cost of the absence days in 2013: € 7,432,590
- Personal absences days in 2013: 65,482 days (only in Emergency Medicine and Services division)



Picture: Well-being at work suffers if the working environment is not correctly organized.

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SUMMARY

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- The hospital's facilities are too cramped and impractical for current Hospital operations and waste and laundry flows. Waste and laundry material volumes have grown so large that new modern ways of transfer them are needed.
- There are too few elevators for the current needs.
- Garbage and soiled laundry stays at wards and corridors for very long periods of time.
 - o Fire safety issues
 - o A healthy workplace environment suffers
 - Occupational safety suffers
 - Generally working on with waste and soiled laundry transfer is very heavy physically.
 - o It is very hard for the neck, shoulders and back area
 - Laundry Service people are working in 3-month periods due to the hard workload
- Non-functioning Hospital logistics affects to the work atmosphere.
- Regular monitoring of waste and laundry flows and volumes.
- Sorting of Waste and Laundry has to be simple process and the process should prevent incorrect sorting.

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COMPARISON TABLE OF THE OPERATION SAVINGS/LOSS

Below is a comparison table of Savings and Expenses. When the Hospital using the manual way of transporting Waste and Laundry and when the Hospital using the (AWCS) Automated Waste and Laundry Transfer System.

Easy conclusion is that the system will pay back the investment shortly and the yearly savings are high. Not to forget the all the other system's benefits. We are taking about saving hundreds of thousands euros every year.

Base information					
No of beds	-	340	beds		
No purses service team		1961	persons		
		Value in euros / year			
		Traditional manpower.		New hygienic and automatic	
		bins.elevators, storages at wards.	Difference factors	waste/laundry logistic	Explanations
	Cost EUR/year	unhygienic method		,,,	• • • • • • • • • • • • • • • • • • • •
		Savings		Savings	
Cost of sick leave days	3300000	0	-0,5% units	- 294 150	Better working environment, no odor, less sickness by germs/viruses
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Cost of accident at work	35000	0	-1 serious case/10 years	- 35 000	No heavy lifts, transport, less trucks on corridors, manual handling,
Savings at service manpower	76000	0	2 person less	- 76 000	Hygienic vacuum logistic is automatic
Savings in elevator costs	15000	0	-1 elevator less needed	- 15 000	Payback time 10 years
Savings in truck costs	9000	0	-1 truck less / 5 years	- 9 000	Yearly costs
					Electricity cost difference between floor
Savings in electricity costs	1900	-300	300 eur/year for vacuum system	-	areas/elevators/cooling&heating vs. vacuum transfer
Total logistic savings /year		-300		- 429 150	
Payback time				3,5 years	Taking in account investment cost difference
Loss in ten 10 year time		- 2 789 475			Lost value in traditional method- hygienic chain questionable
Savings in ten 10 year time				- 2 789 475	Saved money for better hyginiec and patient care

Picture: The green color shows the savings when the Hospital is using the AWC system and the red color shows the expenses if the Hospital is not using the system.

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