Automated data sharing / verification solution for risk management of new, used and damaged battery shipments

79th SMDG Plenary Meeting - 3rd Apr 2025



New, Used and Damaged Lithium Batteries

Deflagration and Lithium Battery Risk Exposure

In the event of deflagration

- Oxygen not needed
- Heat not needed
- Fuel the cell and/or the battery itself

To lower the risk of deflagration

- Risk = Likelihood x Impact
- Impact: deflagration event
- Decrease the likelihood:
 - Conduct technical analysis
 - Ship only with State of Charge below certain thresholds





Image Source: www.firehouse.com

Current Situation

- IMDG code has no requirements for used, undamaged batteries (only for new/damaged)
- State of Health (SOH) in EU Battery Regulation Annex VII doesn't align with realistic parameters. Some of the industry stakeholders view **the approach as oversimplified**, failing to account for the complex performance characteristics and degradation patterns across different battery chemistries.
- Different lithium-ion battery chemistries like NCM (Nickel Cobalt Manganese) and LFP (Lithium Iron Phosphate) complicate the implementation of a "blanket solution" in battery technologies, making a single universal approach impractical.

SOC & SOH



- Measures the current battery capacity as a percentage of its maximum charge
- Similar to a fuel gauge in conventional vehicles
- Decreases during use
- Increases during charge
- Calculated using voltage, current and temperature measurements



- Measures battery's current maximum capacity compared to its original/factory capacity
- Indicates long-term battery degradation over time
- Decreases gradually over battery lifespan
- Used to estimate remaining battery life

Risk Level Associated with Used & Damaged Batteries

These levels must be declared by a "technical expert" of producer or authorized agent.



Level 1

Used,

Level 2

Damaged, still meeting UN38.3 criteria



Level 3

Damaged, not meeting UN38.3 criteria

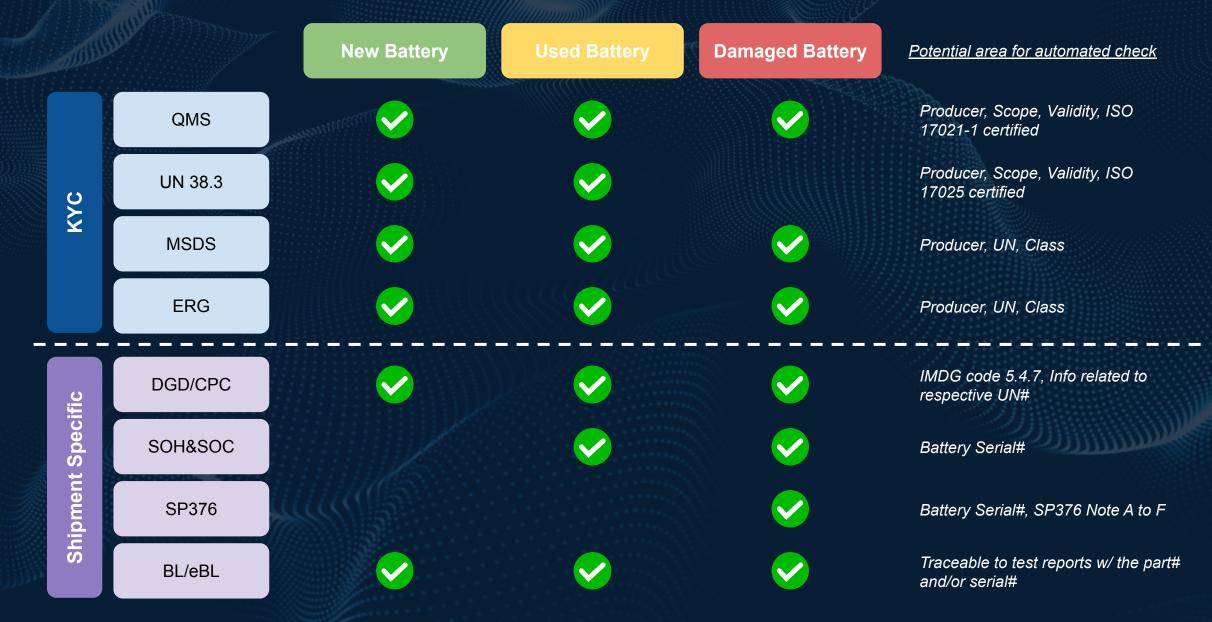
still meeting UN38.3 criteria



Critically damaged, not meeting UN38.3 criteria

Level 4

Document requirements - under discussion process



Benefits of SOC & SOH for used battery and damaged battery



Additional tool for risk assessment* by both shippers and carriers.



Reduction of incidents based on the SOH analysis of the batteries (not mandatory in IMDG code).



Clear reference document to establish liability in case of incidents.

* Legal basis for SOH as declaration in EU Battery Regulation 2023/1542 Annex 14.4(b)

CDC booking document submission through a digital portal on GSBN

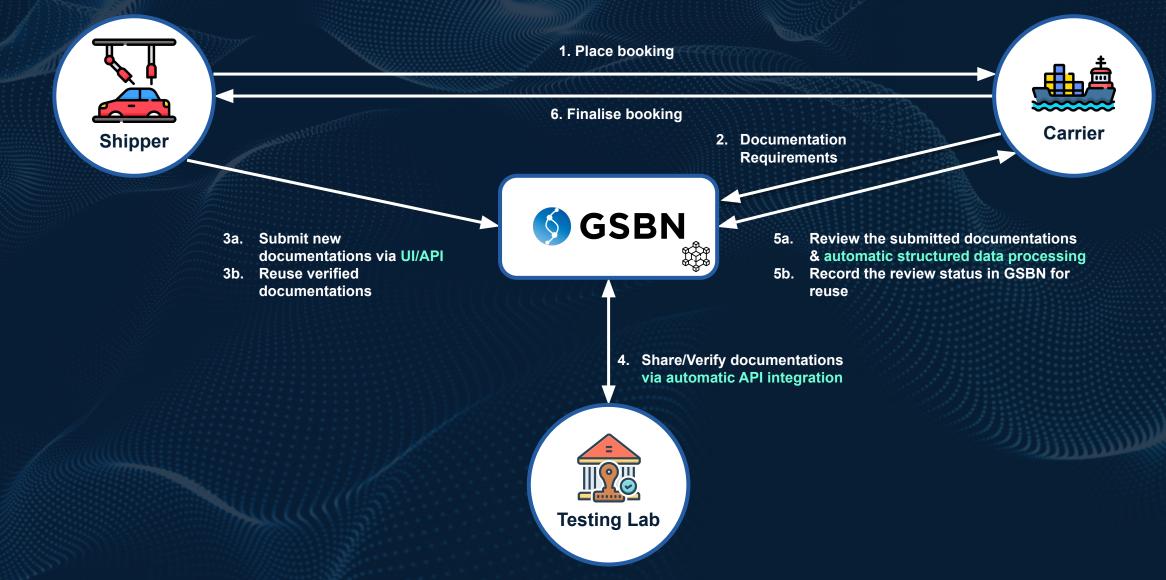
Scope of the pilot

Instead of using emails to submit documents, a major EV manufacturer (as shipper) has piloted with a major shipping line on the use of a digital portal to upload CDC documents on GSBN.

Benefits:

- 1. Efficient shipper can reuse previously verified documents.
- 2. Automation with structured data shared by labs, carriers can automate checking processes.
- 3. Immutable documents are written on blockchain, thus are tamper-proof.
- 4. Auditable the full life cycle of the documents from submission to verification are logged on blockchain/ this could be important for claims with P&I

Document Submission Process



All transactions are protected by the GSBN blockchain platform to provide full traceability and auditability.

Document Submission UI for Shipper

Search Booking & Booking List

		2.2.2.2.2.2.2	10°			1111111
O CSBN Here to simplify O SSBN Here to simplify	y tradi: × +	3ooking/fileUpload			* ¥ (New Chrome available
GSBN	≡ Here to simplify to	rade for all				
DG Booking File Upload	Search DG Booking					
Document Repository	Carrier SCAC Input Name		king Reference No. Input Number	Container No. Input Number	Search	
	DG Booking File Req	uest List				
	Upload Date & Time 💠	Carrier SCAC \$	Booking Reference No.	Container No.	No. of Files Uploaded	Action
	2024-12-03 15:44	TEST	KI-EBKG11706495	KI-MSDU11706495	3	View Detail
	2024-12-03 15:06	TEST	KI-EBKG09453073	KI-MSDU09453073	2	View Detail
	2024-12-03 11:12	TEST	KI-EBKG95245336	KI-MSDU95245336	2	View Detail
	2024-12-02 15:26	TEST	KI-EBKG23310402	KI-MSDU23310402	3	© View Detail
	2024-11-21 17:23	TEST	ST-BKRNo21230838	ST-ConT21230838	4	View Detail
	2024-11-18 15:55	TEST	ST-BKRNo13947297	ST-ConT13947297	10	View Detail
	2024-11-18 14:41	TEST	ST-EBKG57549083	ST-MSDU57549083	11	View Detail
	2024-11-18 14:35	TEST	KI-EBKG99708887	KI-MSDU99708887	7	View Detail
Homepage						
Logout						
- npany: shipper_dummy_001			Total	a < 1 >		
r: shipper_001_admin@test.gsl					Privacy policy 1 © Copyright Global Ship	Ferms and Conditions of Us ping Business Network 202

Document Requirements for Booking

Booking File Upload	DG Booking File Upload												
cument Repository	All 12	UN38.	36 DGD 1 M	Carrier DTC MSD 1 CVS 4		Reference No. No13947297	Container No. ST-ConT13947297		٤				
	No.	Type MSD	Document Ref No. EASON-202411181530	File Name	Valid Until 2024-11-20	Remark	Uploaded Date 2024-11-18	Action					
	003	UN38.3	EASON-202411181530 EASON-202411181529	6 - normal_case_2_pos.pdf 5 - nomarl_case.pdf	2024-11-20		2024-11-18	+ Download	× Rem				
	005	CVS	EASON-202411181531	3 - case1-original.pdf			2024-11-18	🕁 Download	× Rem				
	006	CVS	testdamon2	CVS.pdf	2024-12-07	testdata	2024-11-18	± Download	× Rem				
	007	UN38.3	EASON-202411181529	5 - nomarl_case.pdf	2024-11-18		2024-11-18	Ł Download	× Remo				
	008	UN38.3	EASON-202411181529	5 - nomarl_case.pdf	2024-11-18		2024-11-18	🛓 Download	× Remo				
	009	UN38.3	EASON-202411181529	5 - nomarl_case.pdf	2024-11-18		2024-11-18	🛓 Download	× Rem				
	010	UN38.3	1	MSDS.pdf	2024-11-27		2024-11-18	🕹 Download	× Rem:				
	011	CVS	TEST12345	dummy-ebldc.pdf	2025-02-15		2025-02-03	🕹 Download	× Rema				
mepage				I agree to the Terms	of Use and confirm that the	information submitted is genuin	e, accurate, and complete.						

Document Selection / Upload

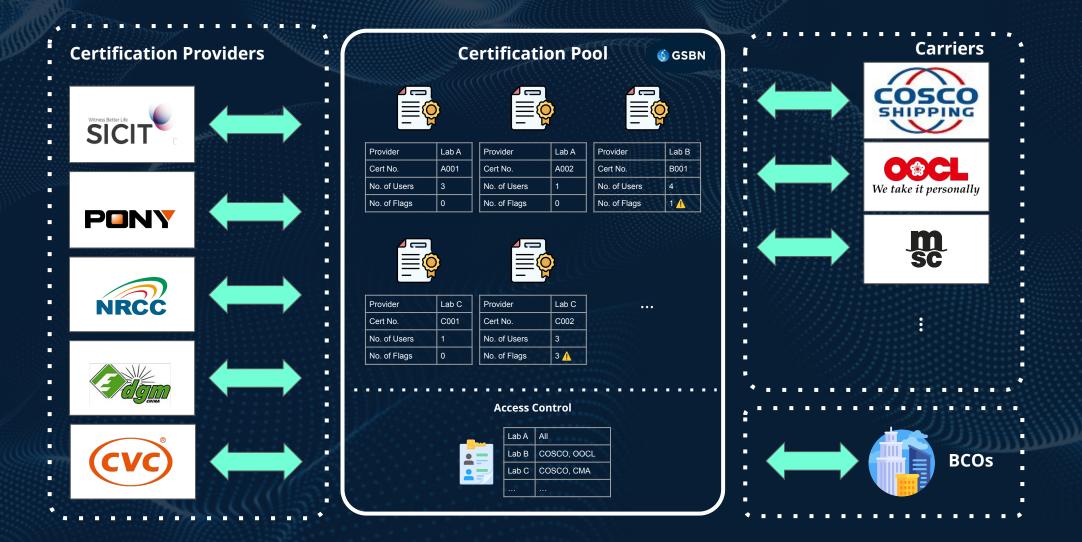
GSBN Here to simplify t	radi x	+										
← → Ø S certificate-pool-	web.com	mon-np.gsbn.r	network/dgBooking/	fileUpload						☆	0	New Chrome available
🔇 GSBN	Ξ	Here to sir	mplify trade f	or all								
1 DG Booking File Up				U	pload File /	As - UN38.	3 ~				×	
Document Reposito		Select the I	file from the D	ocument Repository	Only valid file(s) will be listed		Se	arch				
	- 6	Docur	ment No.	File Name	Valid Until	Remark		Uploaded Date	Action			
		• TEST1	2345	sample_un_38.3_ts.pdf	2025-12-31	UN38.3 Test Report		2025-02-03	🕁 Download			초 Upload
					Total 1	< 1 >				•		
	_					OR				_		× Remove
				nput the required data	1							× Remove
		Documer File Name *	nt Details		Document Ref No. *		Valid Un	til •			1	× Remove
				± Upload			8				1	× Remove
		Remark									1	× Remove
											1	× Remove
										+ Ad	۰.	× Remove
	010	UN38.3	1	MSDS.pdf		2024-11-27			2024-11-18	⊥ Down	load	× Remove
	011	CVS	TEST12345	dummy-ebidc.pd	#	2025-02-15			2025-02-03	. de Down	load	X. Remove
G Homepage					agree to the Terms of Use	and confirm that the inform	nation submitted is gen	ine, accurate, and comple	ite.			
G Logout						Confirm	Back					
Company: shipper_dummy_001 User: shipper_001_admin@test.gsl									© Convi	Privacy poli	cy Ten	ns and Conditions of Use a Business Network 2025

Key functionalities:

- 1. Shippers can search for DG booking created by carrier.
- 2. In each booking, carrier would have already outlined the required documents.
- 3. Shipper can select previously uploaded documents or upload new documents.

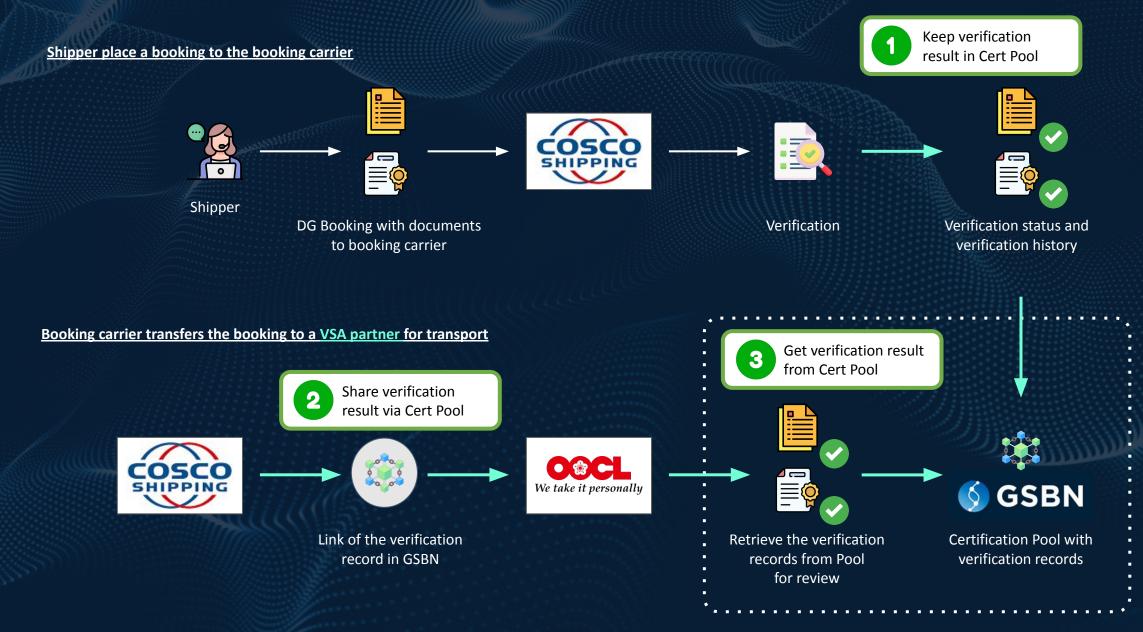
Certification Pool & Certificate Sharing between VSA Partners through GSBN

Certification Pool



Certification Pool can act as a **single source of truth** for stakeholders to record and share information about the certificates.

Certification Pool to Facilitate Sharing of Certificates



Certification Pool to Facilitate Sharing of Certificates

		S. Carlos and S.						All is a second second						
- Add	Download Impor	t Template	port With Sub-table	2							(±) (±		0	e c
	Create Time 🤹	IS FROM A 🌲	CARRIER 👙	SMAPLE N 🌻	MANUFACT 韋	ENTRUST CODE MAIN 🌲	CUSTOMER FILE	DEPARTME 💠	E ‡	F 🌲	REA 🌲	S 🌲	SUBMIT	r by 🌲
	2024-09-25 08:	Alliance	OOCL	锂离子电池 INR	无锡市	21240020		无堪市			Real		ke	I.C
	2024-09-25 08:	1 Alliance	EMC	真空吸尘器 227	莱売电4	21240011	4	莱克电		5	Real	G	zh	CO
	2024-09-24 16:	COSCO		锂-二氧化锰扣	深圳市	3 21240079		浙江荣		0	Real	0	yiı	I.C
6	2024-09-24 16:	Alliance	CMA	锂二氧化锰扣式	深圳市	MRIMT5BG4		深圳市			Real		zh	co
	2024-09-24 16:	Alliance	OOCL	吸尘器X7内含	苏州斯	21240053		苏州斯			Real		zh	CO
	2024-09-24 16:	COSCO		HM活性炭	河南化	20240050		河南化			Real		ke	I.C
	2024-09-24 15:	Alliance	ONE	挂脖风扇 (内	宁波鼎)	21240080	6 B	宁波鼎;			Real		ke	I.C
	2024-09-24 15:	Alliance	OOCL	锂离子二次电池	江西程	21240000		江西程			Real		zh	co

- Source of the Certificate
- 2 Product Name and Manufacturer
 - Certificate Number (Link to GSBN)
 - Related Certificates (such as MSDS, 38.3 Test Report, etc.

Verification Results

Verifier (Verification History can also be kept for audit)

Entrust Code : 2124007931263	17	Effective Date : 2024-02-03	Expiry Date : 2025-01-01			
		Chinese		English	English	
Department Name:	HIRE		Zhejian	o., Ltd		
Manufacture Name:	深圳市画		SHENZ	DNICS CO.,LTD		
Sample Name:	- 二氧化锰扣式电芯CR2032 3.0V 230	0mAh 0.69Wh	Li-MnO2 Button Cell CR2032 3.0V 230mAh 0.69Wh			
Sample Name Alias	1					
Sample Shape:	银色钮扣状金属外壳		Silvery Button metal shell			
Cargo Nature:						
Transport Type:	國际海事组织(國际海运危险货物规则 Code (2022 Edition)	③ (2022院) IMO International Maritime Dangerous Goods				
Business Category:	這輸搬是·罐电池		0102			
Lithium Battery Test Summary:	Net Weight 1.505	Lithium Content : 0.063	Net Weight 1.5	505 Lithium Cor	itent 0.0	
Ennum Battery rest Summary.	Capacity 230mAh	Vottage 3	Capacity 23	30mAh Vol	tage 3	
Conclusion	suggestionAccordingToIMOIMDGCode	hazardsidentification=理全權电法。 Lithium metal battery . =根据特殊规定168、该物品不能MO IMDG Code其他总数规制。 sions of IMO IMDG Code according to special provision 188)	suggestionAccordingTolN	s=无。 None., hazardsidentification=讀金篇 MOIMDGCode=懷護特殊规定188、读物品 to other provisions of IMO IMDG Code acc	不受IMO IM	

