Usage of Point Cloud and ShipConstructor in retrofit projects









Structural design with ShipConstructor and Point Cloud









Usage of point cloud with ShipConstructor in structure design

>Analysis and compare of existing drawings and actual design

Retrofit projects without existing drawings

Simplified design and local modeling with full

understanding of surrounding area

Analysis and compare of existing drawings and actual design Profile and plate compare



Analysis and compare of existing drawings and actual design Cut out and opening compare







Retrofit projects without existing drawings New installed deckhouse based on point cloud data









Simplified design and local modeling with full understanding of surrounding area







Piping design with ShipConstructor and Point Cloud









3D laser scanning of the ship



\mathcal{X}

Result of scanning the ship's engine room



A 3D model of the ship's existing ballast system has been created







Existing pipeline without Point Cloud



 \mathcal{X}

The routing of a new pipeline with ballast water treatment system components was created



Point cloud of the existing structures of the ship.



 \mathbb{X}

The modeled pipeline in the obtained Point cloud.



8

An accurate routing is achieved without additional corrections during installation



 \mathcal{X}

Extraction of the central line



Pipeline routing by centerlines



 \mathbb{X}_{c}

Conclusion

Using the point cloud, we can:

1. Reduce the time for modeling, producing working documentation, and specifications.

2. Perform accurate modeling considering the layout of the space.

3. Accelerate preparatory work for clients and reduce their costs.

Electrical design with ShipConstructor and Point Cloud



Usage of electrical design with ShipConstructor

Complex solution for marine electrical systems.

>Electrical design with point cloud.

>Challenges that we are facing.

Electrical design for rig E.House











Electrical design with point cloud.













Challenges that we are facing PIL, one of the steps for cable routing

Project It	tems List										- 0	×
Project Item	ns											
🕭 New Eq	uipment 💌 💜 New Pipe Connectio	on 💌 🖺 🗱	1	• 🞽 🔒	ĩ	2						
In Use 🔻	Name	Description T	Full Stock Name	T Dra	wing		Y Part	T Connectio	on Status 🔻 🍸	Stock Description 🔻	Item Type 🔻	r -
~	MVSWG-3		Upper Con LEFT (E-House 4)\/ Co	nteiner Upper	Left (E-Hous	e 4) MVSW(3-3	8		💩 Equipment	t
\checkmark	SWG-0001		Lower Con LEFT (E	-House 3)\S Co	nteiner Lower	Left (E-House	e 3) SWG-0	001	9		🕹 Equipment	ć –
\checkmark	SWG-0002		Lower Con RIGHT	(E-House 2) Co	nteiner Lower	Right (E-Hou	se 2) SWG-0	002	9		🕹 Equipment	t
~	Trafo T5706		Lower Con LEFT (E	-House 3)\1 Co	nteiner Lower	Left (E-House	e 3) Trafo T	5706	9		🕹 Equipment	t
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Status 🔻	Name		T Connec	tion Type 🛛 🔻	Item1 T	Item2 T	Cable Group	>	▼ Cat	ole Stock 🔻		
9	Trafo T5709 - SWG-0002 (1)		🥠 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (10)		🥔 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
\smile	Trafo T5709 - SWG-0002 (11)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (12)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
\sim	Trafo T5709 - SWG-0002 (13)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (14)		🥔 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (15)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (16)		🥔 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
~	Trafo T5709 - SWG-0002 (17)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (18)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
\sim	Trafo T5709 - SWG-0002 (19)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (2)		🥔 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (20)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
S	Trafo T5709 - SWG-0002 (21)		🥔 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (22)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	∉ 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (23)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	∤ 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (24)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (3)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (4)		🧼 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	∢0,69 kV	179	29 (1x300)		
9	Trafo T5709 - SWG-0002 (5)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
1	Trafo T5709 - SWG-0002 (6)		🛷 Elect	rical Connection	Trafo T5709	SWG-0002	Power supply	y 0,69 kV	179	29 (1x300)		
	T		A Flort	1.1.0	Trafa TE700	SINC 0000	Dowor cupple	0 69 W	170	(1x300)		
	11810 15709 - SWG-0002 (7)		Se Elect	rical Connection	1101013709	20005	Power supply	Y 0,05 KV		25 (11000)		

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Creating space allocation and cable routing



Another option of cable routing



Developing production drawings





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	ALL R	31004	appiler mixe	· cone oronp	Camechan	Length	Length	Length	Cutte Puble							
						(an)	(mm)	(m)	6401 (D1800) - 11-11-							
	12280009	11454 (18300)	Shipyard TKP	Power supply upy ky	VSU-9707 - 17010 15707 (1)	900,0	500,0	22,0	Cont 2 Lep 6. CABLENTE	Prouring 0,098 v(cont_1)-0.	KV(Cont. 2)-0001	an Usega	, configuega, config	Z_Legit Conviziolegiz Co	ini zjungis,	
	122W0010	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (2)	503,0	\$93,0	22,0	CABLENTRY-Low voltag	e routing 0,69KV(Cont_1)-00	004, Cont.1_Leg.3, Co	ont (Leg.4	Cont.1_Log.7, Cont.2	2_Leg1, Conit 2_Leg 2, Co	int.2_Leg.5,	
_	1225-0001	1000 /1-2001	Shinand TVE	Rever combined to be by	V50.5331 - Texte 15332 (2)	601.0	501.0	22.0	Cont 2, Leg 6, CABLENTE CABLENTRY J or voltor	IY-Low voltage routing 0,69 in caution 0.698/Vi/Cost 11-00	KV(Cont_2)-0001	of Lank	Fort Line 7 Fort	2 Len 1 Cont 2 Len 2 Co	nt 7 an 5	
	122 10011	(1747 (11244)	unpyard no	Free supply cost of	rad-aray - mare raver (a)	2040	20040	11,0	Cont.2_Leg.6, CABLENTF	Y-Low voltage routing 0,69	KV(Cont_2)-0001			Conde Constanting of		
	122W0012	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (4)	593,0	500,0	22,0	CABLENTRY-Low voltag	pe routing 0,69KV(Cont_1)-00	004, Cont.1_Leg.3, Co	ont (Leg.4	, Cont.1_Leg.7, Cont.2	2,Leg.1, Cont 2,Leg.2, Co	int 2_Leg 5,	
в	122W0013	17929 (1x300)	Shipvard TKF	Power supply 0.69 kV	VSD-5707 - Trafe T5707 (5)	501.0	501.0	21.0	CABLENTRY-Low voltas	recting 0.69KV(Cont_1)-00	WV(Conf_2)-0001 004, Cont.1_Leg.3, Co	of Lleg 4	Cent.1.Leg.7. Cont.:	2.Leg.1 Cont 2.Leg.2 Co	int 2_Leg 4,	
									CABLENTRY-Low voltage routing 0,69KV(Cont_2)-0002							
	122W0014	17929 (1+300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (6)	500,0	500,0	20,0	CABLENINT-Low voltage routing (control)-coust, control ago, control ag						int 2_Leg.6,	
_	122W0015	17929 (tx300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (7)	503,0	503,0	21,0	CABLENTRY-Low voltage	e routing 0,69KV(Cont_1)-00	Cent.1,Leg.7, Cont.	2_Leg.1 Conit 2_Leg.2, Co	nt 2,Leg 4,			
	1220-02004	10000 (4-300)	This and The	Dec. 10 (10) (10)	UTO 7333 Tools 77333 (4)	500.0	C00.0	24.0	CABLENTRY-Low voltage routing 0.69KV(Cont_2)-0002 CABLENTRY-Low voltage routing 0.69KV(Cont_2)-0002							
	12240010	(1747 (11244)	ampyard no	Town reput to a	rad-arar - mare raver (e)	20040	20040	100	CABLENTRY-Low voltage routing 0.69KV(Cont_2)-0002							
¢	122W0017	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe 15707 (9)	500,0	500,0	20,0	CABLENTRY-Low voltage routing 0.69KV(Cont_1)=0004, Cent.1_Leg.3, Cont.1_Leg.4, Cent.1_Leg.7, Cont.2_Leg.1, Cont.2_Leg.3,							
	122W0018	17929 (1+300)	Shipyard TKF	Power supply 0.69 kV	V50-5707 - Trafe 15707 (10	593.0	501.0	20.0	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_2)-0 pe routing 0,69KV(Cont_1)-00	003 004. Cent.1 Lea.3. Co	ont 1 Lea 4	Cent 1 Leg 7. Cont 2	2 Les 1 Cont 2 Les 3		
									CABLENTRY-Low voltag	e routing 0,69KV(Cont_2)-0	003					
_	122W0019	17929 (tx300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe 15707 (1)	500,0	500,0	20,0	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_1)-00 pe routing 0,69KV(Cont_1)-00	004, Cont.1,Leg.3, Co 003	ont (Leg.4	, Cont.1,Leg.7, Cont.	2_Leg.1, Cont.2_Leg.3,		
	122W0020	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 75707 (12	1 500,0	500,0	20,0	CABLENTRY-Low volta:	e routing 0,69KV(Cont_1)-00	034, Cont.1_Leg.3, Co	ont Ling A	Cont.1_Leg.7, Cont.2	2_Leg1, Cont 2_Leg3,		
	-	-							CABLENTRY-Low voltag	e routing 0,69KV(Cont_2)-0	003		Contract Contra			
D	12280021	(1975 (18360)	Shipyard Inc	Power supply ups ky	vau-a/u/ - Indio 15/u/ (13	1 2000	2010	19,5	CABLENTRY-Low voltag	pe routing 0,69KV(Cont_2)-0	001 CONTRICTORY 6, CO	an. Coegu	com 2 cog c com 2	coega, com 2,0ega, co	m z'rete	
	122W0022	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe T5707 (14) S00,0	500,0	19,6	CABLENTRY-Low voltag	pe routing 0,69KV(Cont_1)-00	002, Cont.1_Leg.6, Co	int.Lieg7	Cont 2_Leg 1, Cont 3	Leg2, Cont 2,Leg5, Co	int 2_Leg.6,	
	122W0023	17929 (1x300)	Shipyard TKF	Power supply 0.69 kV	VSD-5707 - Trate 15707 (15	502.0	502.0	19.6	CABLENTRY-Low voltage	<pre>pe routing 0.69KV(Cont_2)-0 pe routing 0.69KV(Cont_1)-00</pre>	001 302. Cont.1 Leg.6. Co	nt.1 Leg.7	Cont 2 Leg 1 Cont 3	2 Lea 2. Cont 2 Lea 5. Co	nt 2 Lea 6	
_									CABLENTRY-Low voltage	e routing 0,69KV(Cont_2)-0	001					
	122W0024	17929 (tx300)	Shipyard TKF	Power supply 0,65 kV	VSD-5707 - Trafe 15707 (16) 500,0	500,0	19,6	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_1)-00 a routing 0.69KV(Cont_1)-00	992, Cont J_Leg.6, Co 001	int. Lleg.7	. Cont 2_Leg 1. Cont 2	2_Leg 2, Cont 2_Leg 5, Co	int 2, Leg. 6,	
	122W0025	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (17	1 500,0	500,0	18,5	CABLENTRY-Low volta:	e routing 0,69KV(Cont_1)-00	002, Cont.1_Leg.6, Co	et.Leg?	Cont 2_Leg 1, Cont 3	Leg2, Cont 2,Leg.4,		
ε	1225-0026	1010 /1-2011	Shinand TVE	Rever evenin 648 by	USD 2333 Texts 75383 /18		602.0	18.5	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_2)-0 te routing 0,69KV(Cont_2)-0	002 102 Cost 1 Las 6 Ca	attien7	Foot 2 Log 1 Foot 2	las2 foot2 las i		
	122 00020	(iver (insee)	anyyara no	Fore supply out of	120-2107 - Thate 12727 (1	y	200,0	10,0	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_2)-0	002	an	. con Ljoby c com s			
	122W0027	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe 15707 (19	1 500,0	500,0	18,5	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_1)-00	332, Cont 1_Leg.6, Co	int:Ukg7	, Cont 2_Leg 1, Cont 3	2_Leg 2, Conit 2_Leg 4,		
-	122W0028	17929 (tx300)	Shipyard TKF	Power supply 0.69 kV	VSD-5707 - Trafo 15707 (20	0 503,0	500,0	18,5	CABLENTRY-Low voltag	pe routing 0,69KV(Cont_1)-00	002 102, Cont.1_Leg.6, Co	int:1_Leg.7	Cont 2 Leg 1, Cont 3	2_Leg2, Cont 2_Leg4,		
				-					CABLENTRY-Low voltag	pe routing 0,69KV(Cont_2)-0	002					
٢	12280029	(1929 (11300)	Shipyard Tite	Power supply u.or ky	vod-o/d/ - 1/d/d 15/d/ (2)) 594,9	200/0	17,5	routing 0,69KV(Cont_2)-	-0003	AN, CONTRACTOR	in congr	, con 2 degit can a	Cost Contention	a voriage	
	122W0030	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15707 (22	9 5020	500,0	17,5	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_1)-00	992, Cont.1_Leg.6, Co	int.1_Leg7	Cont.2_Leg.1, Cont.3	2_Leg3, CABLENTRY-La	w voltoge	
	122W0031	17929 (tx300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe T5707 (25	() 503,0	500,0	17,5	CABLENTRY-Low volta:	routing 0,69KV(Cont_1)-00	002, Cont.1,Leg.6. Co	int.1_Leg.7	Cont 2,Leg 1, Cont 2	Leg3, CABLENTRY-Lo	w voltage	
									routing 0,69KV[Cont_2]	-0003						
-	122W0032	11929 (1x300)	shipyard TKF	Hower supply 0,69 kV	vsu-5707 - Trafo 15707 (24	·) 500,0	500,0	17,5	cadLENTRY-Low voltage routing 0.696VIEget 20-	pe rouring 0,69KV(Cont_1)-00 -0003	aux, contriguegit, Co	er.U.eg?	, cont 2_Leg 1, Cont 3	Curgid, CABLENTRY-La	w voltage	
	122W0033	17929 (tx300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo T5709 (1)	500,0	500,0	20,9	CABLENTRY-Low voltag	e routing 0,69KV(Cont_1)-00	003, Cont.1_Leg.2, Co	int.1_Leg.1	Cont.1_Leg.8, Cont.2	Leg.7, Cont.2_Leg.9, Co	et 2 Leg 11,	
G	1226/0026	17979 /1+3001	Shipperd THE	Rouse supply 0.49 KV	V50-5317 - Texto 15318 (2)	501.0	501.0	20.9	Cont.2_Leg.12, CABLENT CABLENTRY-Low voltor	RY-Low voltage routing 0,6' to routing 0,6%EV/(Cost 1)-00	9KV(Cent_2)-0007 333_Cont_1_Len_7_Ce	et11en1	Cont 1 Las 8. Cont 2	Last Cest 2 Last Cr	et 7 Lea 11	
	ALC #10054	10103 (00300)	amplete 195	the supply ups to	100-3107 - 11010 13767 (2)	594,4	V		Cont.2_Leg.12, CABLENT	RY-Low voltage routing 0,6	9KV(Cent_2)-0007		con graph, care	Construction of the second s	and a court of the	
	122W0035	17929 (tx300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafe 15709 (3)	503,0	500,0	20,9	CABLENTRY-Low voltage	pa routing 0,69KV(Cont_1)-00	103, Cont 1_Leg 2, Co	int.1_Leg.1	Cont.1_Leg.8, Cont.2	Leg 7, Cont 2, Leg 9, Co	et.2_Leg.11,	
	122W0036	17929 (1x300)	Shipyard TKF	Power supply 0,69 kV	VSD-5707 - Trafo 15709 (4)	500,0	500,0	20,9	CABLENTRY-Low voltas	pe routing 0,69KV(Cont_1)-00	333, Cont 1_Leg 2, Co	int.Leg1	Cont. L.Leg.B. Cont. 2	Leg T, Cont 2, Leg 9, Co	et 2,Leg 11,	
-		-							Cont.2_Leg.12, CABLENT	RY-Low voltage routing 0,6'	9KV(Cent_2)-0007					
	122N0037	1145A ((#300)	ompyard TKP	Hower supply 0,69 kV	vou-o/u/ - Trafo 15709 (5)	5010	2010	20,0	CABLENTRY-Low voltage	pe routing 0,69KV(Cont_1)-00 pe routing 0,69KV(Cont_2)-00	223, Conr. (_Leg 2, Co 008	er. Ukgil	Com. Useg 8, Conf. 2	Usegu, cent 2 Leg 9, Le	er zjueg II,	
н											SEAL	e I no	AMNING NO		-	
									11 Prof.	Alexander Tanev, floor 6,	1715	- 1	NV-32	0110-006	Sheet 8/13	