



US CMS EMU meeting

Anode Front-End electronics status.

N.Bondar, T.Ferguson, A.Golyash, N.Terentiev

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Anode Front-End electronics status

- AFEB production status
 - CMP16-G ASIC
 - AFEB production
 - AFEB certification
 - AFEB shipment
- AFEB-ALCT cable production
- Delay chip DEL16 test status



AFEB production status

CMP16_G ASIC

- Produced quantity 25,000
- Tested 16,500
- Selected for soldering for US 13,300
- for Dubna 1,500 (already sent to CERN)
- Yield rate 90%





AFEB production display

Need to produce 12,000
 Total ordered 10,000
 Total delivered to FNAL 10,000

	CY2001					CY2002											Made	Total needed	Balance	Shipped out.	Total at FNAL	
	prev.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov						Dec
Delivered to FNAL	1109			747	2446													10000	10000	0		4934
Burned in	1109			400	1600	2000	1800	2000										8909				
Assembled		250		580	1500	398	1879	2117										6724				
Tested		250		580	1500	255	1709	1894										6188				
Packaged			248			1008	1074	3636										5966				
Shipped to:																						
UF			124				539															663
UCLA			124				535															659
PNPI						1008	1152															2160
IHEP/flat							720															720
IHEP/tray							864															864
																						Total shipped out: 5066

Certification statistic: Total measured 6163
 Total certified 5250
 Yield rate after cuts 92.6%
 Final yield rate (including chip selection) ~83%

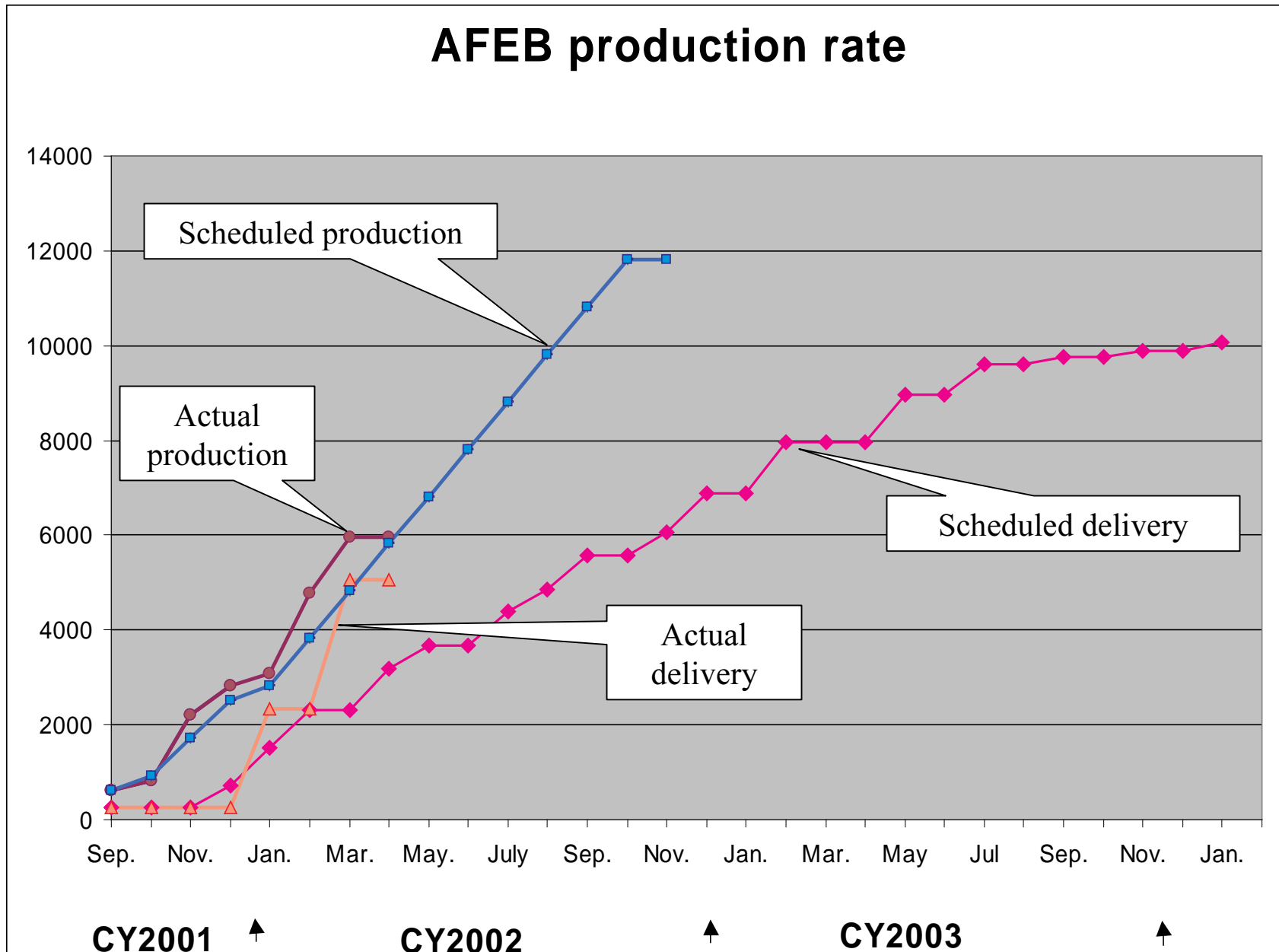
After burn in procedure we find about 1% of failed boards. Main reason - failure of soldered contact.

More information about AFEB test result in WEB page:

<http://www-hep.phys.cmu.edu/cms/MASSPRTEST/AFEB/passmp.html>



AFEB production and shipment rate





Anode electronics assembly procedure.

 **The following instructions were prepared:**

Instruction for AFEB installation (<http://www-hep.phys.cmu.edu/cms/>)

Instruction for AFEB-ALCT cables installation for ME234/2 chamber (<http://www-hep.phys.cmu.edu/cms/>)

Instruction for AFEB-ALCT cables installation for ME1/2 chamber -final release

Instruction for AFEB-ALCT cables installation for ME2/1 chamber -final release

Instruction for AFEB-ALCT cables installation for ME3/1 chamber -first release

Instruction for repair broken M4 thread .

Need to prepare:

 Instruction for AFEB-ALCT cables installation for ME1/3 chamber - the chamber in Lab 7.

Instruction for AFEB-ALCT cables installation for ME4/1 chamber - the chamber in Lab 7.



AFEB-ALCT cables display

																	Prepared by N. Bondar					
																	Last revision 03/27/02					
Chamber type	FAST site	CY2001										CY2002						Made	Total needed	Balance	Ship.	Stored at FNAL
		Mar	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.					
ME 234/2	deliv.	8	10	10	10			10	10	10		10	10	10			98	148	50		37	
	UF						15					16								31		
	UCLA					1	15					14								30		
ME1/2	deliv.	9	10	10	10			10	10	10		5					74	74	0		74	
	IHEP																			0		
ME1/3	deliv.							1	5	9		9	10	10			44	74	30		44	
	IHEP																			0		
ME2/1	deliv.		9	10	10			8									37	38	1		1	
	PNPI											36								36		
ME3/1	deliv.									6	6		6	8	8		34	38	4		16	
	PNPI											18								18		
ME4/1	deliv.																0	38	38		0	
	PNPI																			0		

Total cables to produce - 10760
 Total produced cables - 7554
 Production balance - 3206

- ☺ ME234/2 - 98 sets made, 61 shipped to FAST sites
- ☺ ME2/1 - completed, shipped to PNPI.
- ☺ ME3/1 - 34 sets made, prepared for shipment
- ☺ ME1/2 - completed, prepared for shipment to IHEP
- ☹ ME1/3 - 44 sets made, prepared for shipment
- ⊘ ME4/1 - standby position.





AFEB-ALCT cables display

Number of chamber cable sets delivered to FNAL

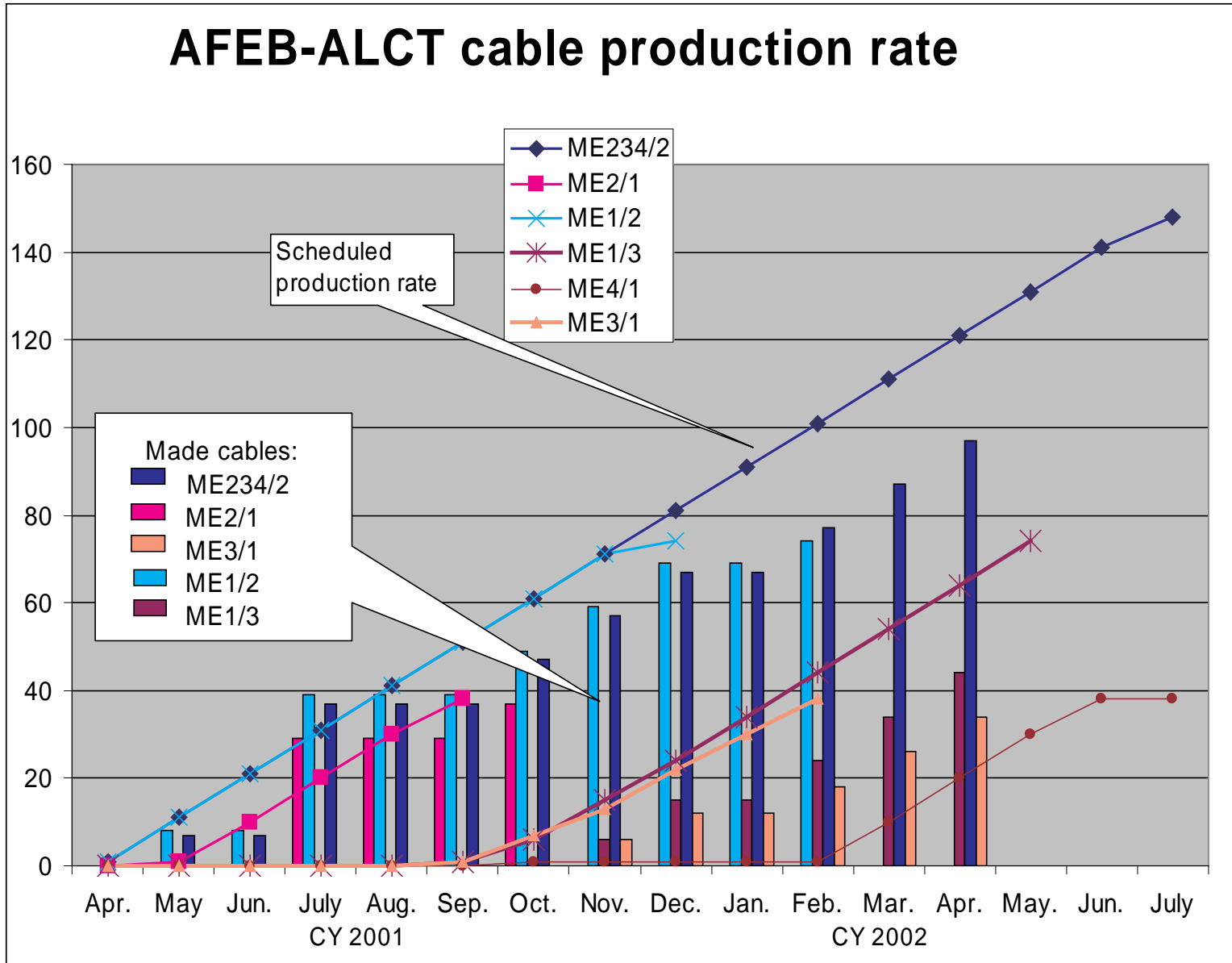
Chamber type		Total scheduled	Production of cable sets for each chamber type, monthly rate.																Total delivered	Balance of delivered sets	Cable length (foot)
			CY2001								CY2002										
			March	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	Apr.	May	Jun.			
ME234/2	Scheduled	148	1	10	10	10	10	10	10	10	10	10	10	10	10	10	7				
	Delivered			8		30			10	10	10		10	10	10			98	50	15435	
ME2/1	Scheduled	38		1	9	10	10	8													
	Delivered					29			8									37	1	6021.75	
ME3/1	Scheduled	38						1	6	6	9	8	8								
	Delivered								6	6	6	6	8	8				34	4	4641	
ME4/1	Scheduled	38							1						9	10	10	8			
	Delivered																			38	0
ME1/2	Scheduled	74	1	10	10	10	10	10	10	10	3										
	Delivered			9		30			10	10	10		5						74	0	6021.75
ME1/3	Scheduled	74						1	5	9	9	10	10	10	10						
	Delivered								1	5	9		9	10	10				44	30	1848
Total	delivered			17	0	89	0	0	29	31	35	0	30	28	28	0	0	0	287		33967.5

Number of cables delivered to FNAL

	Total needs	CY2001											CY2002						Total delivered	Total length of cable	Balance of delivered cables
		March	Apr.	May	Jun	July	Aug.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	March	Apr.	May	Jun.				
MC-400073	228	33	30	30	30	0	0	30	30	30	0	15	0	0	0	0	0	0	228	598.5	0
MC-400074	906	66	60	60	60	0	0	66	90	114	0	84	60	60	0	0	0	0	720	1890	186
MC-400075	2191	66	168	180	180	0	0	156	132	132	0	117	126	126	0	0	0	0	1383	4840.5	808
MC-400076	2642	99	198	210	210	0	0	189	177	189	0	159	156	156	0	0	0	0	1743	6100.5	899
MC-400077	1150	66	141	150	150	0	0	132	96	96	0	66	48	48	0	0	0	0	993	4344.375	157
MC-400078	453	33	30	30	30	0	0	30	30	30	0	30	30	30	0	0	0	0	303	1590.75	150
MC-400079	680	33	30	30	30	0	0	33	45	57	0	57	60	60	0	0	0	0	435	2283.75	245
MC-400080	453	33	30	30	30	0	0	30	30	30	0	30	30	30	0	0	0	0	303	2386.125	150
MC-400081	453	33	30	30	30	0	0	30	30	30	0	30	30	30	0	0	0	0	303	2386.125	150
MC-400082	453	33	30	30	30	0	0	30	30	30	0	30	30	30	0	0	0	0	303	2916.375	150
MC-400083	453	33	30	30	30	0	0	30	30	30	0	30	30	30	0	0	0	0	303	2916.375	150
MC-400098	698		81	90	90	0	0	72	36	36	0	36	48	48	0	0	0	0	537	2349.375	161
First shipment, individual cables																	Total number of cables		7554		
																	Total length of assembled cables		34602.75		



AFEBA-ALCT cables display





Delay chip DEL16 status.

The new stand setup and new “on line” program for delay chips selection already installed.
 The tester behavior now is more stable.
 Test results became more consistent.



Produced	25,000
Tested	8997
Rejected (dead)	32
Parameters out of nominal	389
Good chips	7930
Yield rate (pass all cuts)	~ 88%
All good chips divided for 9 groups:	

Group #	1	2	3	4	5	6	7	8	9
Yield rate	2.5%	3.9%	7.5%	9.9%	11.4%	15.9%	23.9%	10.9%	2.1%

Groups 1,2,3,4,9 are rejected **Final yield rate after selection** ~65%
 Expected number of good chips ~16000



Shipped to UCLA:	Group 6	Group 7	Group 8	Total
	320	1120	640	2080
Prepared for shipment:	1647	2774	1395	5816

Problems:

Very small contact area in the clamp shell connector is a result that the system is very sensitive for dust and dirt. Clamp-shell connector have a limited connection times. First broken connector was found after 7000 ASIC tested. Extra adapter was prepared for testing.