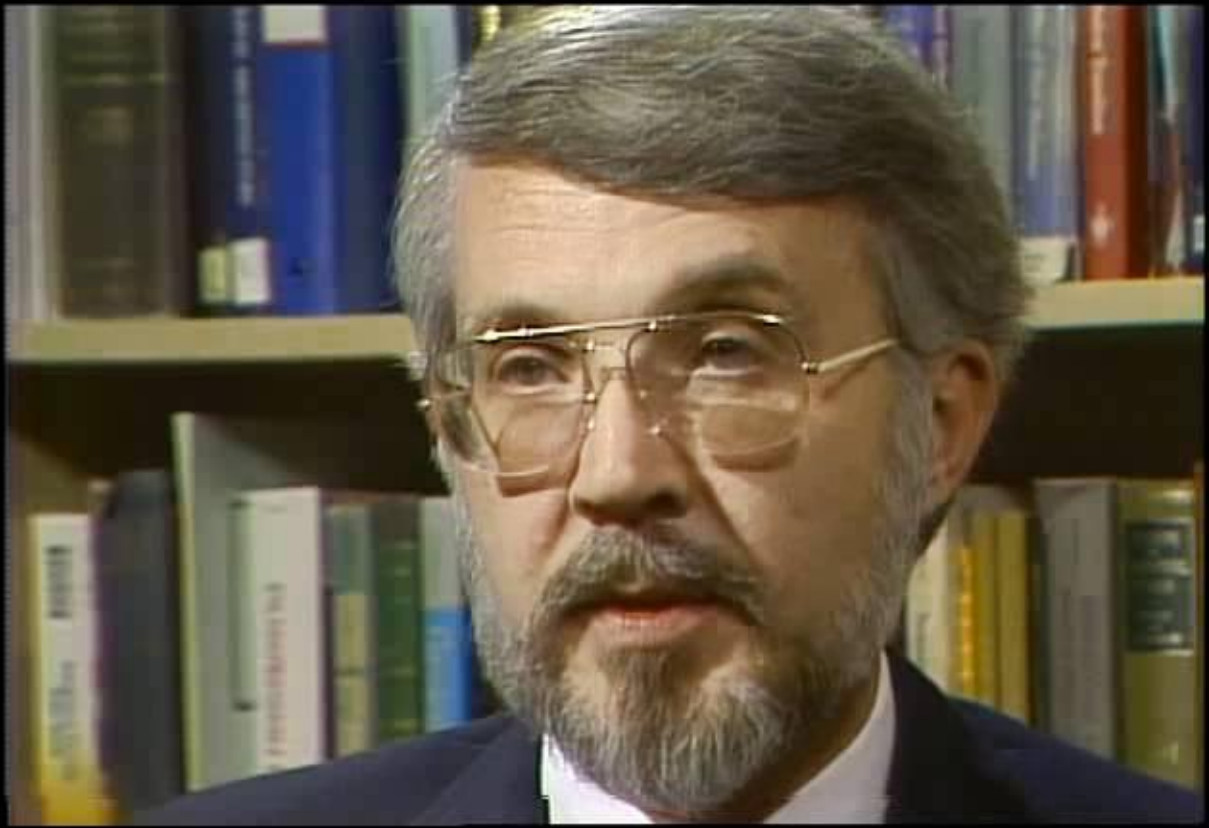

1
00:00:19,279 --> 00:00:17,029
to create a 12-meter yacht had been win

2
00:00:21,560 --> 00:00:19,289
back the America's Cup winning States

3
00:00:24,140 --> 00:00:21,570
was an achievement realized by skipper

4
00:00:26,779 --> 00:00:24,150
Dennis Conner his winning team and the

5
00:00:30,470 --> 00:00:26,789
boat Stars and Stripes on February 4th

6
00:00:32,749 --> 00:00:30,480
1987 many enthusiasts felt that the loss

7
00:00:34,760 --> 00:00:32,759
of the America's Cup warriors earlier to

8
00:00:39,160 --> 00:00:34,770
the Australians was due to a failure to

9
00:00:42,790 --> 00:00:40,900
in an effort to ensure that the

10
00:00:44,350 --> 00:00:42,800
Americans had the faster vote in the

11
00:00:47,799 --> 00:00:44,360
final rounds at this year's competition

12
00:00:50,470 --> 00:00:47,809
many changes were made the design team

13
00:00:52,869 --> 00:00:50,480

led by John Marshall elected to make use

14
00:00:55,210 --> 00:00:52,879
of an drag reduction technology called

15
00:00:57,369 --> 00:00:55,220
riblets developed by NASA's Langley

16
00:01:01,030 --> 00:00:57,379
Research Center and manufactured by the

17
00:01:03,310 --> 00:01:01,040
Priyanka these sheets of pin vinyl

18
00:01:06,130 --> 00:01:03,320
plastic placed on the underside of stars

19
00:01:09,990 --> 00:01:06,140
and stripes are actually microscopic

20
00:01:12,820 --> 00:01:10,000
scratchers perfect triangular each

21
00:01:15,700 --> 00:01:12,830
running the entire length of the button

22
00:01:17,109 --> 00:01:15,710
John Marshall explains the boat itself

23
00:01:19,240 --> 00:01:17,119
looks a little bit like the Space

24
00:01:21,700 --> 00:01:19,250
Shuttle in the sense that the surface is

25
00:01:24,820 --> 00:01:21,710
paved would be separate plaques of

26
00:01:27,070 --> 00:01:24,830
Riblet material rather than having a

27
00:01:29,529 --> 00:01:27,080
meticulously smooth surface this is an

28
00:01:32,020 --> 00:01:29,539
intentionally rough surface and it is

29
00:01:35,620 --> 00:01:32,030
the microscopic roughness that makes it

30
00:01:37,749 --> 00:01:35,630
work and that leads to testable drag

31
00:01:42,070 --> 00:01:37,759
reductions in a variety of different

32
00:01:44,679 --> 00:01:42,080
research by placing a small section of

33
00:01:47,200 --> 00:01:44,689
the 3m Riblet film under a high-powered

34
00:01:50,490 --> 00:01:47,210
microscope it's easy to see the riblets

35
00:01:53,319 --> 00:01:50,500
and their near-perfect triangular groove

36
00:01:55,320 --> 00:01:53,329
the idea for rivets came out of research

37
00:01:58,980 --> 00:01:55,330
to modify airplane

38
00:02:01,470 --> 00:01:58,990

with less resistance same researchers

39
00:02:03,270 --> 00:02:01,480
also found that some sharks have Riblet

40
00:02:05,310 --> 00:02:03,280
like skin that allows them to glide

41
00:02:09,120 --> 00:02:05,320
effortlessly through the water

42
00:02:10,440 --> 00:02:09,130
reporting Langley's Ben animals we noted

43
00:02:13,200 --> 00:02:10,450
from some Russian literature that

44
00:02:15,150 --> 00:02:13,210
certain sharks have a structure or skin

45
00:02:17,190 --> 00:02:15,160
structure very similar to a Riblet

46
00:02:19,110 --> 00:02:17,200
structure you look at these things under

47
00:02:21,720 --> 00:02:19,120
microscope there are tiny be shaped

48
00:02:23,520 --> 00:02:21,730
grooves aligned with the flow of the

49
00:02:26,220 --> 00:02:23,530
right scale according to our Windtunnel

50
00:02:29,960 --> 00:02:26,230
experiments to reduce drag only the fast

51
00:02:32,520 --> 00:02:29,970
sharks have these the slow sharks do not

52
00:02:34,440 --> 00:02:32,530
it was engineer Mike Walsh who

53
00:02:37,440 --> 00:02:34,450
originated research on riblets at

54
00:02:39,510 --> 00:02:37,450
langley the microscopic v grooves were

55
00:02:43,080 --> 00:02:39,520
first studied on machined aluminum

56
00:02:44,880 --> 00:02:43,090
plates in this low speed wind zone 3m

57
00:02:47,760 --> 00:02:44,890
then developed a way to put riblets on

58
00:02:49,380 --> 00:02:47,770
vinyl test samples of the Riblet film

59
00:02:52,290 --> 00:02:49,390
have been flown by Boeing aircraft

60
00:02:54,630 --> 00:02:52,300
company and aboard a NASA Learjet to

61
00:02:56,910 --> 00:02:54,640
confirm its efficiency according to Ben

62
00:03:00,410 --> 00:02:56,920
Enders the reduction of skin friction by

63
00:03:03,479 --> 00:03:00,420

rivets is on the order of 6 to 8%

64
00:03:05,580 --> 00:03:03,489
luckily in proceedings for the airline

65
00:03:07,559 --> 00:03:05,590
industry in the estimate that comes

66
00:03:10,589 --> 00:03:07,569
savings for the US commercial airline

67
00:03:14,190 --> 00:03:10,599
fleet at roughly 300 million dollars per

68
00:03:16,050 --> 00:03:14,200
year since it's lighter than paint 3m is

69
00:03:18,020 --> 00:03:16,060
also looking at the riddle of material

70
00:03:20,670 --> 00:03:18,030
as a protective coating for our plant

71
00:03:22,559 --> 00:03:20,680
because the technology is new there are

72
00:03:24,960 --> 00:03:22,569
still many unanswered questions but

73
00:03:27,390 --> 00:03:24,970
scientists feel that riblets can be used

74
00:03:29,729 --> 00:03:27,400
in a postive applications the natural

75
00:03:36,240 --> 00:03:29,739
gas pipelines the submarines and

76
00:03:38,670 --> 00:03:36,250
racecars nasa's Riblet technology a

77
00:03:39,980 --> 00:03:38,680
high-tech solution that helps keep