

Optimal spraying conditions of soap-based fire extinguishing agent for peat fires and what I Learned in Indonesia

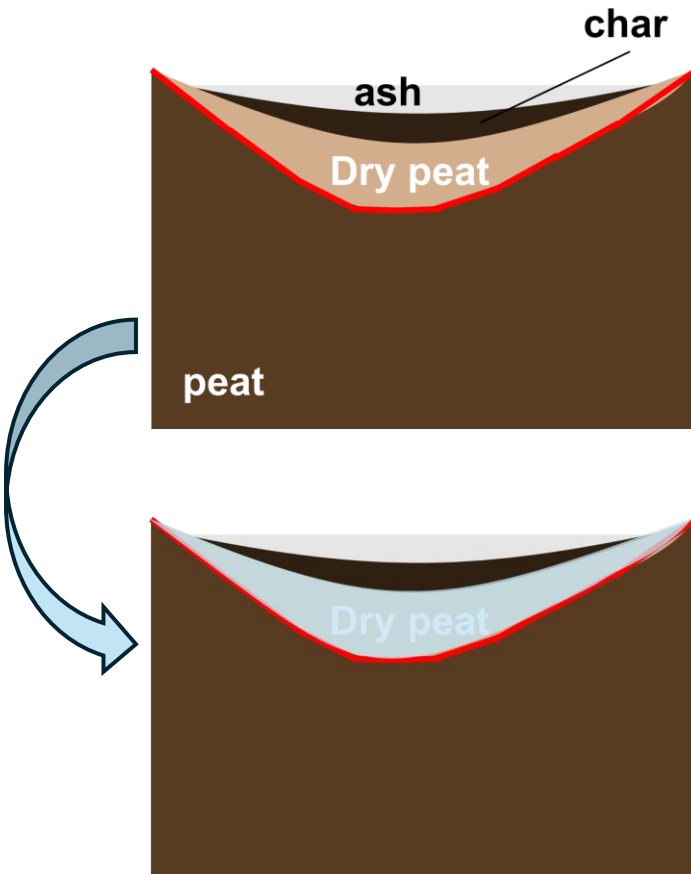
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My Research Theme

Theme

Optimal spraying conditions of soap-based fire extinguishing agent for peat fires



Finding the right amount and rate of application is necessary to achieve a peat moisture content of 50% or more with a limited amount of water.

$$\text{Moisture content} = \text{Water weight} / \text{Peat weight}$$

Efficient spraying method

Spraying
speed

Spraying
amount

Assumed to affect infiltration

Method

1. Fill transparent case with dry peat

Using peat moss

2. Spraying soap-based extinguishing agent(20wt%)

Spray speed : 0.3 ~ 1.5 L/min

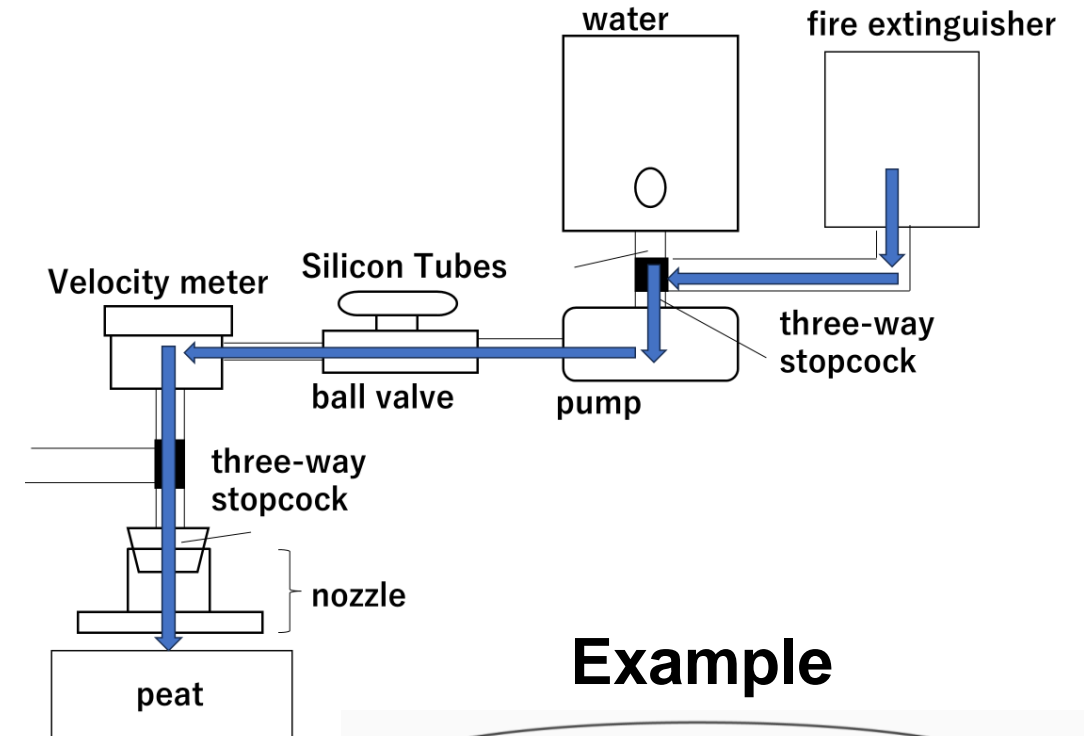
Volume : 0.3 ~ 0.7 L (6.6~15 L/m²)

3. Dig up peat

Dig the peat 1 cm deep and weigh the surface moisture content of the peat in the case.

H block's Moisture content $\geq 58.1\%$

moisture content $\geq 50\%$
→ Can prevent the spread of fire

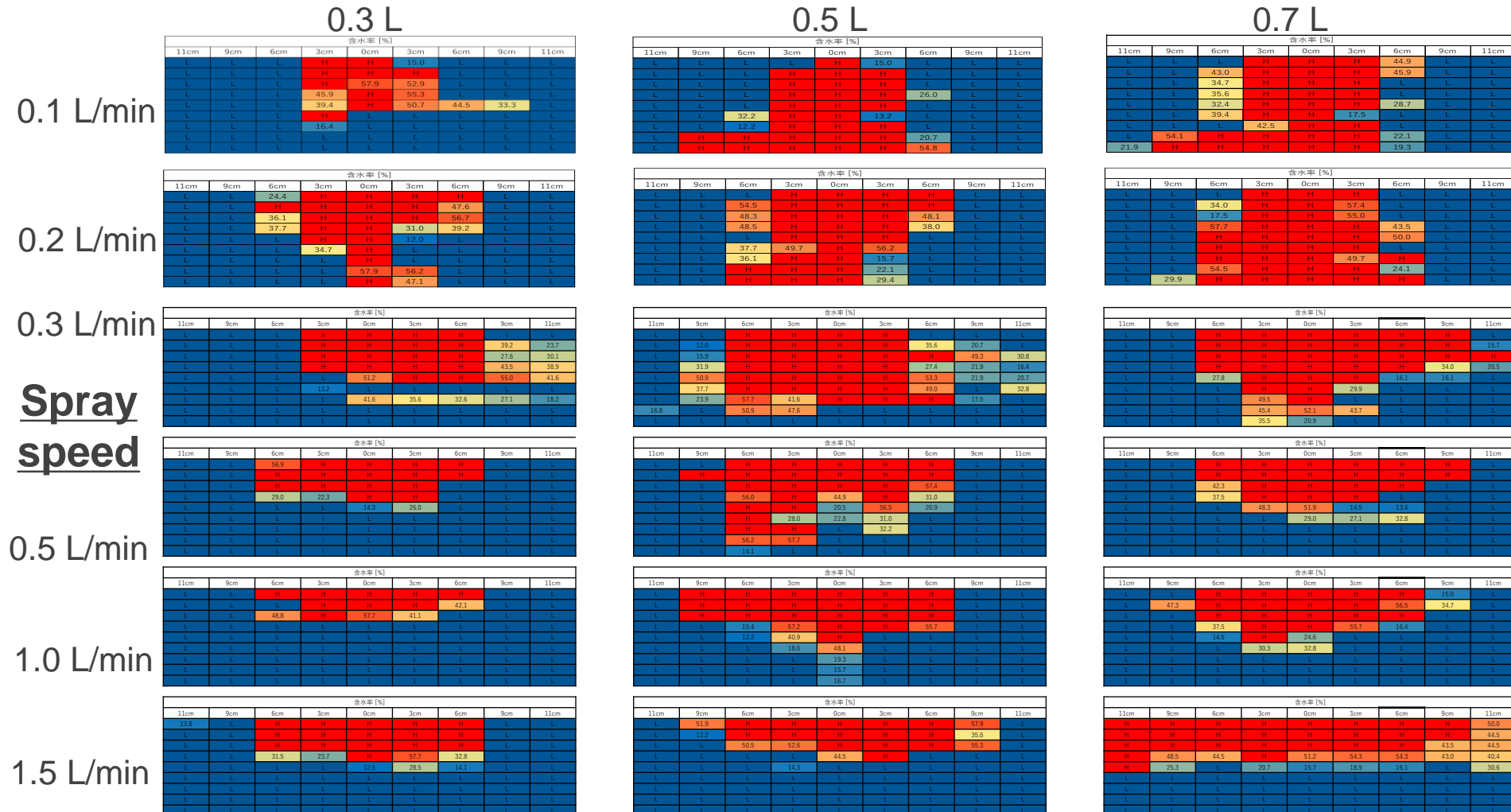


Example

depth								
11	9	6	3	0	3	6	9	11
L	L	L	52.1	51.2	51.4	48.5	27.4	L
L	L	34.0	H	56.5	H	56.2	H	43.0
L	L	26.9	56.5	51.7	53.3	55.7	51.4	19.6
L	L	31.7	52.9	53.3	53.8	50.7	52.1	L
L	L	38.5	49.7	50.9	49.5	54.3	40.6	L
L	L	20.9	31.2	49.5	49.0	40.4	L	L
L	23.0	L	27.8	22.5	30.3	L	L	L
L	L	L	L	24.6	23.1	L	L	L
L	L	L	L	15.9	L	L	L	L

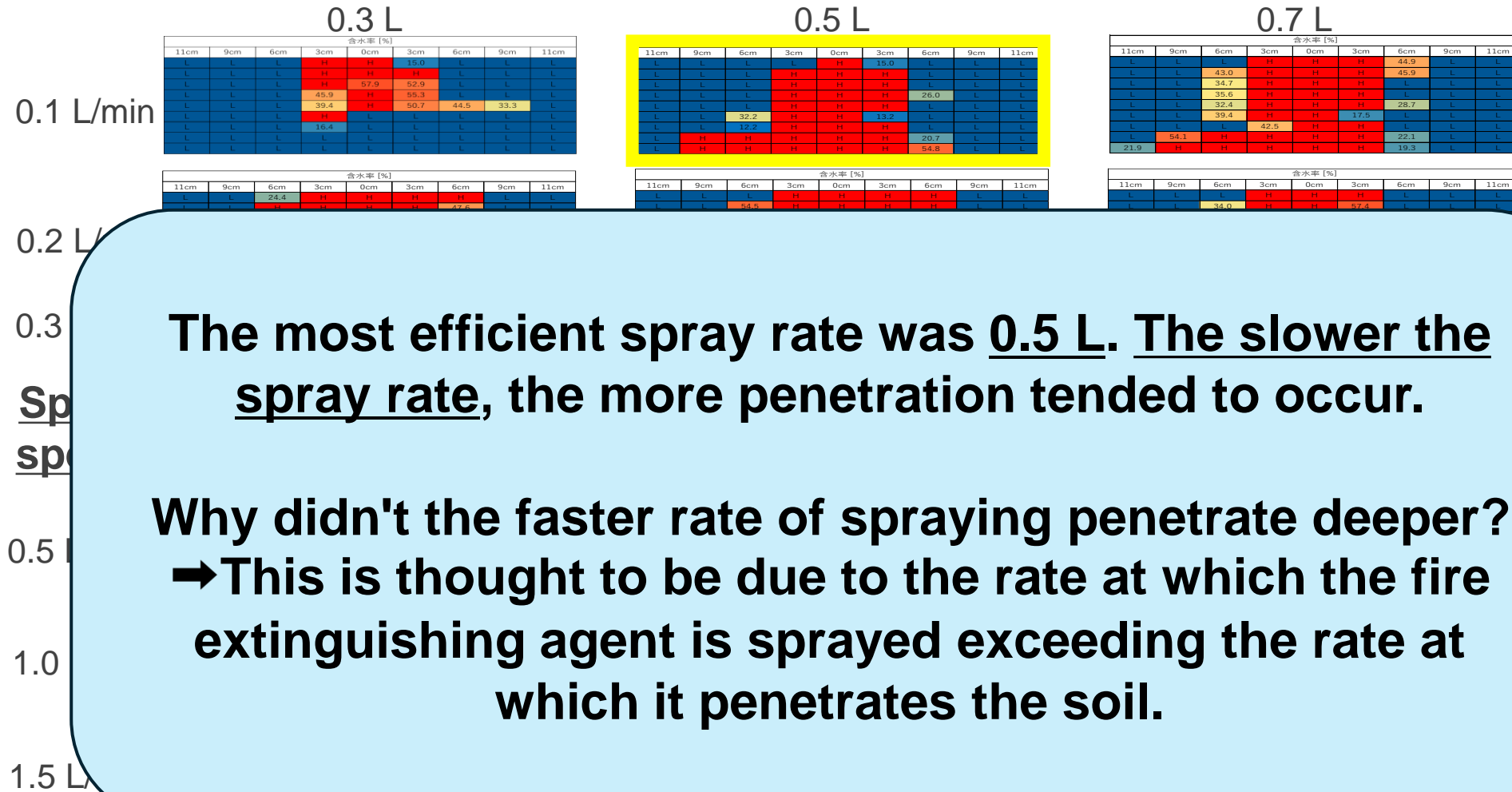
Result

Amount of soap-based extinguishing agent solution



H block's Moisture content $\geq 58.1\%$ ⁴

Amount of soap-based extinguishing agent solution



Activities in Indonesia

Period

2023/8/3~2023/9/2 (31days)

2024/8/15~2024/8/31 (17days)

Activities

- Environmental Performance Evaluation
- demonstration
- Own Experiments



Result | peat moss and Indonesian peat

Moisture content [%]

12cm	9cm	6cm	3cm	0cm	3cm	6cm	9cm	12cm
L	L	H	H	H	H	L	L	L
L	12.0	H	H	H	H	35.6	20.7	L
L	15.9	H	H	H	H	H	49.3	30.8
L	31.9	H	H	H	H	27.4	21.9	16.4
L	50.9	H	H	H	H	53.3	21.9	20.7
L	37.7	H	H	H	H	49.0	L	32.8
L	23.9	57.7	41.6	H	H	H	17.5	L
16.8	L	50.9	47.6	L	L	L	L	L
L	L	L	L	L	L	L	L	L

Peat moss

Moisture content of peat surface

: 12.0% or less

Density

: 0.156 g/cm³

Number of H blocks

: 28

✗ **H block's** Moisture content $\geq 58.1\%$

Moisture content [%]

12cm	9cm	6cm	3cm	0cm	3cm	6cm	9cm	12cm
L	L	H	H	H	H	H	H	49.7
31.0	30.6	53.6	H	H	H	H	H	43.6
14.1	30.6	H	H	H	H	H	44.7	33.8
14.1	28.3	37.5	H	H	57.9	57.4	H	18.9
15.9	27.8	41.8	H	H	H	52.6	48.1	16.6
15.7	14.1	45.4	H	53.8	H	H	57.7	23.5
L	13.2	27.1	H	H	H	55.5	53.3	18.9
13.4	13.6	50.7	57.7	54.8	H	H	34.0	15.7
13.8	18.9	34.5	57.9	53.3	52.6	52.4	15.9	14.1

Indonesia peat

Moisture content of peat surface

: 13%

Density

: 0.298 g/cm³

Number of H blocks

: 30

Indonesian peat wets better than peat moss.

What I Learned in Indonesia

About the Experiment

- I was able to touch the local peat and get a feel for its texture.
 - The importance of careful experimental design
 - Experimentation with nature is not always as it seems.
- ➔ Finding the best solution in the midst of things not going the way you want them to. This requires knowledge and the cooperation of those around you.



Closing Remarks

この度の渡航に際し多大なるご支援とご協力を賜り、心より感謝申し上げます。
皆様のご支援のおかげで、多くの学びと貴重な経験を得ることができました。
これらの経験を糧にさらに成長して参りたいと思います。

I would like to express my sincere gratitude for your generous support and cooperation during my trip to Indonesia.

Thanks to your support, I was able to learn a lot and gain valuable experience.
We hope to use these experiences to further grow and develop.

Terima kasih sudah mendengarkan
Thank you for your listening